FEBRUARY

This month marks the end of one school semester and the beginning of another. The teacher, therefore, is confronted with two separate duties: The one of pretesting the incoming classes; the other, the testing of the results of a semester's work. The testing itself, however, is not the important thing, but rather what is done with the results obtained from the tests. The teacher who uses the test results merely as a basis for giving grades is overlooking the more important benefits which he and his students can derive from this testing.

Test results should therefore be scrutinized, not merely for their present value, but also for what they may disclose for the future.

THIS MONTH'S COVER

The picture used for our cover this month shows electrical apprentices assembling a 200-KVA generator after having rewound it in the electrical shop of the State Trade School, New Britain, Connecticut.

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VOL. 20, NO. 2 FEBRUARY, 1931

TABLE OF CONTENTS

Technical Education in Great Britain—II, *By Thomas Diamond* 39
Modern Methods in the Teaching of Printing and Typography—II, *By Arnold Levitas* 43
Study of Courses and Equipment of a General Metal Shop, *By J. W. Schell* 47
No Mistake Week, *By R. P. Bell* 55
Standard or Average Time?, *By Laurence Parker* 55
Editorials 56
Bird-House Building, *By Leon H. Baxter* 58
Dutch Colonial House, *By J. E. Ray* 59
Junior-High-School Course Outline for Patternmaking and Molding, *By G. H. Fern* 62

SUPPLEMENTS

Metal Mail Box, *By Conrad B. Bechtold* ..... No. 202
Tap Wrench, *By C. I. Linthicum* ..... No. 203
Bird-House Building, *By Leon H. Baxter* ..... No. 204
Construction of Toy Motor, *By A. D. Keller* ..... No. 205

POSTERS

Dangerous Clothing, *By Roy R. Van Duzee* 63
Putting Nails in the Mouth, *By Jos. J. Lukowitz* 64

PROBLEMS AND PROJECTS

A Metal Mail Box, *By Conrad B. Bechtold* 65
Tap Wrench, *By C. I. Linthicum* .. 65
Construction of Toy Motor, *By A. D. Keller* 66
Walking Camel, *By W. I. Tawes* .. 66
Vegetable Rack, *By Fred W. Megow* 68
Planer Jacks, *By J. T. Hayes* 68
All-Wood Modern Plant Stand, *By George Dally* 69
The Printshop Club, *By Adolph L. Juten* 70
Pewter Napkin Rings, *By E. W. Manzer* 70
Learning How to Measure, *By Fred W. Nickel* 72
Modernistic Floor Lamp, *By U. L. Hiatt* 72
A Door Knocker, *By J. W. Bollinger* 73
Federal Aid Limited to Vocational Training 73

Now, Are There Any Questions? 74
Association and Concention Activities 74
School-Shop Equipment News 32a
News and Notes 36a

A NEW 20-Inch Scroll Band Saw

THIS new Yates-American Y-20 20" Scroll Band Saw is a high class, quality machine that will prove particularly desirable for school use. In every sense it is as much a commercial production machine as the larger 30" and 36" models; the only difference being that of capacity. The illustration gives an idea of its modern design and durable, lasting qualities. It is direct motor driven, fully ball bearing; has tilting table, cast aluminum wheel guards, perfectly balanced wheels, completely guarded saw blade and many other advanced features. Front view of the new Y-20 is illustrated here. Notice that the table lock is brought out to the front of the machine where it can be reached by operator without necessity of walking around the table. The small handwheel immediately below the upper wheel guard adjusts the saw tension. Note the convenient position of the push buttons for stopping and starting the machine. An illustrated circular is available and will be gladly sent on request. A brief study of the specifications below will indicate Y-20's adaptability to practically universal school use at a decided saving in investment cost over the larger models.

SPECIFICATIONS

WHEELS—20" diameter, 1⅛" face, upper wheel aluminum disc, lower wheel web type cast iron. Both wheels rubber covered.

TABLE—Main table 25" x 26" tilting 45 degrees to right and 5 degrees to left. Tilting device is indexed and locked from operator's position. Auxiliary table stationary 7¼" x 9½".

BEARING—Ball bearing upper wheel, lower wheel mounted on ball bearing motor shaft.

WHEEL GUARDS—Cast aluminum doors. One door above and one below.

STRAINING DEVICE—Spring type acting directly on top wheel bearing bracket.

SAWS—Up to 1" wide can be used. Longest 11' 10", shortest 11' 4". One ⅜" wide 24 gauge saw furnished.

CAPACITY—Widest 19½" from saw to frame with guard on. Thickest under guide 10".

FLOOR SPACE—26" x 41".

YATES-AMERICAN MACHINE CO.

Vocational Machinery Division

BELOIT, WISCONSIN

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

Volume 20 FEBRUARY, 1931 Number 2

Technical Education in Great Britain—II

*Thomas Diamond**

AS in this country, the task of carrying on the education of the workers, both young and more mature, is of two types, general and technical. The administration of this work in England has led to the development of different types of classes. Among these are the following.

I. *Day Continuation Classes*

Before 1918 there were a few day continuation classes in Britain, the best known being those conducted in Birmingham for the benefit of the employees of two chocolate-manufacturing concerns. An Act passed in 1918 contemplated that attendance at schools of this type would gradually become compulsory for young workers under sixteen years of age.

In a report submitted in 1925,[3] the English Board of Education expressed the belief that this idea had been postponed indefinitely, if not actually abandoned. Despite this the legislation has not been without its effect. A number of schools of this type have actually been established and, as in the United States, many of these meet on the premises of the employer, although still under the control of the local school authorities.

The time spent by pupils in these schools varies in different communities. Five half days a week are required in some parts of London while only one-half day is required in some of the provinces.

This variation in time naturally causes some difference in the curricula. Generally speaking, the girls receive instruction in English, physical training, hygiene, and domestic duties, while the boys are given English, mathematics, and technical drawing. Where more time is available, the girls may also study arithmetic, office subjects, art, singing, musical appreciation, home nursing, or the care of children. Under similar conditions the boys may study French, office subjects, woodwork, metal work, music, or art. We, in the United States, can readily understand the presence of such subjects as English, shopwork, mathematics, home nursing or the care of children, but the appearance of French, musical appreciation, or art in the curriculum of a continuation school is likely to raise a question as to their fitness.

II. *Evening Continuation Classes*

In most cities facilities are provided for young workers between the ages of 14 and 15 to continue the education they received up to 14 years of age in the regular schools. While these courses are not vocational in character, and in most cases are given in schools other than the technical schools, they are designed to provide the pupils with a background which will enable them to pursue their technical studies more successfully.

The Board of Education reports that the attendance at schools of this type in the whole of England and Wales is about 20 per cent of the children not attending all-day schools[4] although it is as high as 40 per cent in London and 50 per cent in some of the Northern boroughs.

Acording to the same authority the student mortality is as much of a problem in England as it is with school administrators in this country. One case is quoted in the report of the Board which apparently is typical of conditions generally. In this case[5] it was found that 30 per cent of those enrolling at the beginning of the course did not go beyond the first year. Of those who entered the second year, 45 per cent did not go further in the educational scheme. It is believed by some that the cause of this leakage can be traced directly to the course system being used. While this may be true, the conditions have a striking similarity to those in many of the schools in this country where the elective system is being used entirely.

III. *Full-Time Junior Technical School*

These schools are peculiar to England and are of two types:

1. The preapprenticeship school.
2. The trade school.

[3] *Survey of Technical Education in England and Wales*, Board of Education, Educational Pamphlet No. 49, p. 44.

* Associate Professor Vocational Education, University of Michigan, Ann Arbor, Michigan.

[4] *Ibid.*, p. 46.

[5] *Government Report on Technical Education*, p. 47.

The first of these is the more common and is intended to prepare young people for entrance into a trade at the age of 16. The course is not highly specialized, and the outline at least has a strong resemblance to some of the courses in our junior high schools, however different the actual content may be. While the time spent on the various subjects may vary, the following distribution may be considered as being typical:

	Hours Per Week
Mathematics	6
Science	6
English	6
Shop	6
Drawing	5
Physical Exercise	1

In the second type of school, less emphasis is placed upon *mathematics and science, and more emphasis* on actual trade training. In all cases, considerable attention is devoted to the training of the young worker in art.

IV. *Part-Time Day Technical Instruction*

This type of instruction is provided when employers are sufficiently interested to excuse their employees for one or more half days each week for the purpose of attending school. The work is limited entirely to apprentices and it is customary for the employer to pay the young worker for the time spent in school. Many of the courses offered are trade courses, but there are offered also many technical courses of an advanced character.

V. *Part-Time Evening Technical Classes*

It is in this type of school or class that most of the technical education, on the level considered in this discussion, is done. For the sake of clearness, it is convenient to divide the work into the following four courses:

1. *Junior Courses.* Generally speaking, technical education is not given to children under 16 years of age. For those who go to work between 14 and 16, junior technical courses are provided in the Evening Continuation Schools mentioned under "II" in this section.

2. *Senior Courses.* These courses extend over a period of three years, and work is usually offered in mechanical, electrical, and civil engineering, mining, building, the textile industries, chemical manufacturing, and other industries, according to the interests of the community.

3. *Advanced Courses.* These courses are in extension to the senior courses and cover two years. Only the larger schools have a sufficient number of students to justify offering this grade of work, but the smaller schools in communities adjacent to that in which the courses are provided make a practice of sending their students who have reached the standard to the central school.

4. *Minor or Trade Courses.* These courses are comparable to the trade-extension courses offered in the evening schools of this county and are somewhat less ambitious in their aim than the *Grouped Courses* which are followed in the senior and advanced divisions.

Scotland

The procedure in Scotland is similar to that in England, although the terminology is somewhat different. The first educational step in this country is the primary school which serves the same group as the English elementary schools.

When a pupil, 12 years of age, has reached a given standard of attainment in the primary school, he has four possible courses open to him. He may contemplate leaving school at 14; he may consider remaining in school to complete a definite three-year course; he may enter the central school which is similar to that described in the section devoted to England, or he may decide to remain in school for five or six years in order to complete a full secondary course.

In the first two cases he remains in the primary school, in the last case he goes directly to the secondary school at the age of 12.

As in England, evening classes are provided for those who drop out of the regular day classes. Here again a continuous course of instruction is aimed at. The courses offered extend over four or five years with 6 hours a week for 25 weeks each year.

For those who leave all-day school without sufficient preparation to enable them to carry the first year of technical work, preparatory courses of one or two years are provided.

As soon as a student can present evidence of his ability to proceed with his technical work, he enters one of the affiliated technical schools which may be found in most towns of medium size. It is in these schools that students really begin their technical education. When this has been completed satisfactorily, the student is encouraged to proceed to one of the central technical schools where he may enter either the day or evening classes. There are sixteen of these central institutions, four of which are concerned with art and domestic science, one is a commercial school, one is a nautical school, and the remainder are technical schools or colleges.

Most of these central schools are of a high rank and provide opportunities for both day and evening students to work for degrees.

Figure 2 shows the similarity that exists between the plan followed in Scotland and that in vogue in

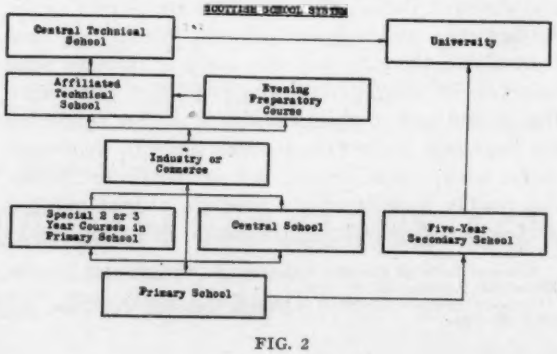


FIG. 2

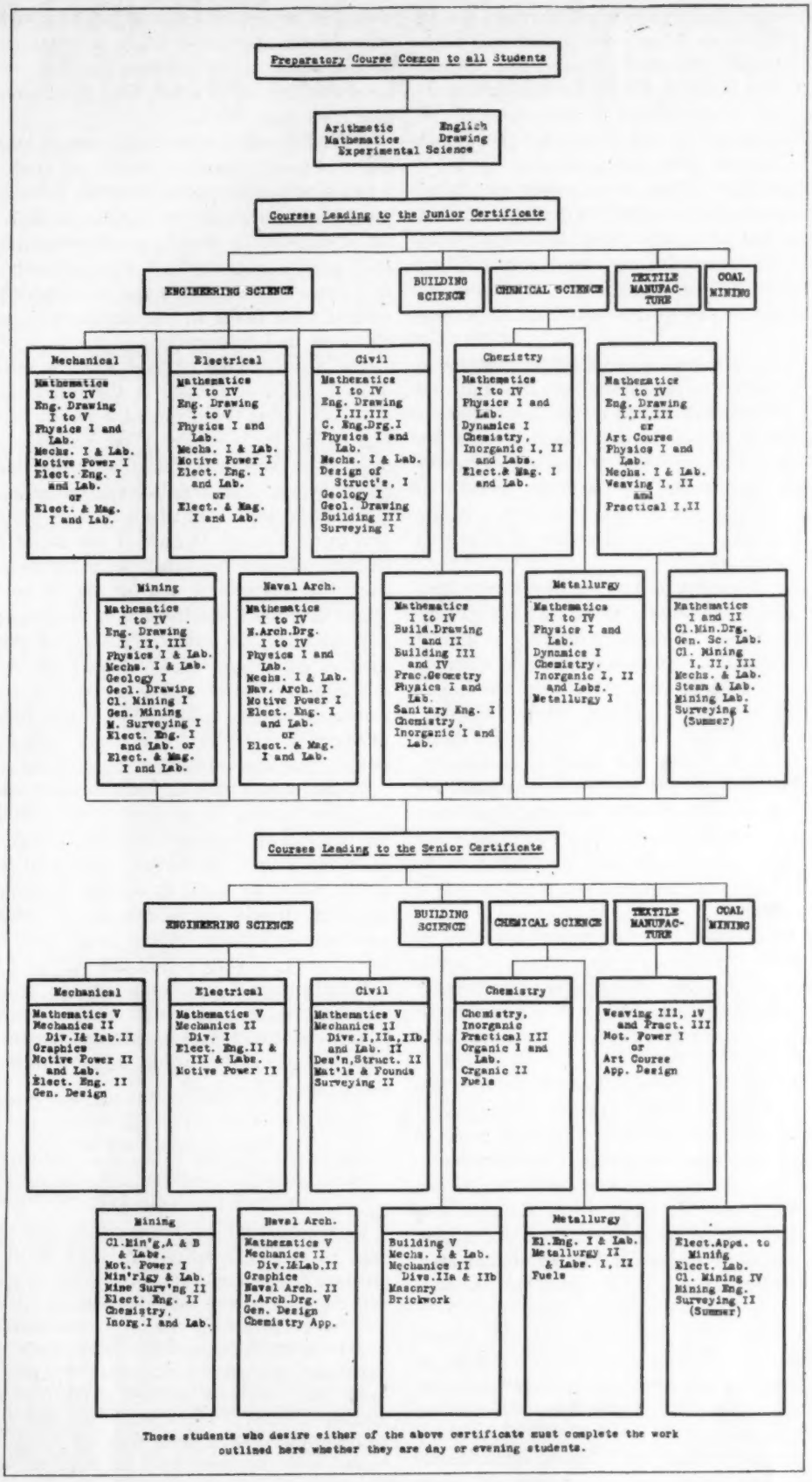

Preparatory Course Common to all Students
Arithmetic
Mathematics
Experimental Science
English
Drawing
Courses Leading to the Junior Certificate
ENGINEERING SCIENCE
BUILDING SCIENCE
CHEMICAL SCIENCE
TEXTILE MANUFACTURE
COAL MINING
Mechanical
Mathematics I to IV
Eng. Drawing I to V
Physics I and Lab.
Mechs. I & Lab.
Motive Power I
Elect. Eng. I and Lab.
or
Elect. & Mag. I and Lab.
Electrical
Mathematics I to IV
Eng. Drawing I to V
Physics I and Lab.
Mechs. I & Lab.
Motive Power I
Elect. Eng. I and Lab.
or
Elect. & Mag. I and Lab.
Civil
Mathematics I to IV
Eng. Drawing I,II,III
C. Eng.Drg.I
Physics I and Lab.
Mechs. I & Lab.
Design of Struct's, I
Geology I
Geol. Drawing
Building III
Surveying I
Chemistry
Mathematics I to IV
Physics I and Lab.
Dynamics I
Chemistry, Inorganic I, II and Labs.
Elect.& Mag. I and Lab.
Mathematics I to IV
Eng. Drawing I,II,III
or
Art Course
Physics I and Lab.
Mechs. I & Lab.
Weaving I, II and
Practical I,II
Mining
Mathematics I to IV
Eng. Drawing I, II, III
Physics I & Lab.
Mechs. I & Lab.
Geology I
Geol. Drawing
Cl. Mining I
Gen. Mining
M. Surveying I
Elect. Eng. I and Lab. or
Elect. & Mag. I and Lab.
Naval Arch.
Mathematics I to IV
N.Arch.Drg. I to IV
Physics I and Lab.
Mechs. I & Lab.
Nav. Arch. I
Motive Power I
Elect. Eng. I and Lab.
or
Elect. & Mag. I and Lab.
Mathematics I to IV
Build.Drawing I and II
Building III and IV
Prac.Geometry
Physics I and Lab.
Sanitary Eng. I
Chemistry, Inorganic I and Lab.
Metallurgy
Mathematics I to IV
Physics I and Lab.
Dynamics I
Chemistry, Inorganic I, II and Labs.
Metallurgy I
Mathematics I and II
Cl.Min.Drg.
Gen. Sc. Lab.
Cl. Mining I, II, III
Mechs. & Lab.
Steam & Lab.
Mining Lab.
Surveying I (Summer)
Courses Leading to the Senior Certificate
ENGINEERING SCIENCE
BUILDING SCIENCE
CHEMICAL SCIENCE
TEXTILE MANUFACTURE
COAL MINING
Mechanical
Mathematics V
Mechanics II Div.I& Lab.II
Graphics
Motive Power II and Lab.
Elect. Eng. II
Gen. Design
Electrical
Mathematics V
Mechanics II Div. I
Elect. Eng.II & III & Labs.
Motive Power II
Civil
Mathematics V
Mechanics II Divs.I,IIa,IIb, and Lab. II
Des'n,Struct. II
Mat'le & Founds
Surveying II
Chemistry
Chemistry, Inorganic
Practical III
Organic I and Lab.
Organic II
Fuels
Weaving III, IV and Pract. III
Mot. Power I
or
Art Course
App. Design
Mining
Cl.Min'g,A & B & Labs.
Mot. Power I
Min'rlgy & Lab.
Mine Surv'ng II
Elect. Eng. II
Chemistry, Inorg.I and Lab.
Naval Arch.
Mathematics V
Mechanics II Div.I&Lab.II
Graphics
Naval Arch. II
N.Arch.Drg. V
Gen. Design
Chemistry App.
Building V
Mechs. I & Lab.
Mechanics II Divs.IIa & IIb
Masonry
Brickwork
Metallurgy
El.Eng. I & Lab.
Metallurgy II & Labs. I, II
Fuels
Elect.Apps. to Mining
Elect. Lab.
Cl. Mining IV
Mining Eng.
Surveying II (Summer)
These students who desire either of the above certificate must complete the work outlined here whether they are day or evening students.

FIG. 3

England. Perhaps the outstanding difference lies in the fact that the six or seven years of technical work is divided between the affiliated and the central schools. The plan is almost identical with the junior-college idea as it is carried out in this country. The central institutions are located at strategic points and recruit their students from the surrounding territory. The Royal Technical College is the central institution in the Glasgow area and is located in that city. Around Glasgow there are 74 smaller communities, each with its affiliated school, and each one carrying on a sifting process to determine the students who should be encouraged or urged to go to the central school for advanced work.

Figure 3 shows the courses a student must complete in Scotland in order to qualify for entrance into the regular technical classes leading to the junior and senior certificates. It shows also what must be done before a student can secure either of the certificates offered for technical work. These outlines serve as a guide to the student and provide him with a rather definite plan of what is expected of him if he wishes to secure a certificate.

It should be of interest to shop teachers to note that not once in this whole outline do we find a shop subject mentioned unless we consider drawing as a shop activity. This seems all the more remarkable when we consider the fact that the work is designed specifically for mechanics who are employed during the day. Whether or not this lack of shop training is a desirable condition is a question that would be open to debate in the United States. However, the probability is that such a course as is presented here would not meet with general approval on the ground that it does not provide an opportunity for the man who wishes to develop some skill in the manipulation of some tool or material.

Whether we approve of the course or not, it is of interest to note that a definite and sequential course has been worked out, that considerable effort is made to follow it, and that specific requirements have to be met before a student may pass from one division to the next.

When a student has secured a certificate for completing the preparatory course, or when he can present evidence of having done work of the same grade in the day schools, he becomes eligible for entrance into the affiliated courses. We have said that these courses are offered in 74 different cities in the Glasgow area as well as in the Royal Technical College at Glasgow. A similar condition prevails in the Edinburgh area, where the central college is the Heriot-Watt Technical College.

As might be expected, the central technical schools have considerable influence over the curriculums of the affiliated schools and exercise some influence on the type of examinations offered as well as in the evaluation of the results.

In every school visited the entrance requirements were rather rigid. The student had to be able to show, either by certificate from an affiliated school or by examination, that he is likely to profit from the instruction given. Furthermore, in those classes which are connected with a trade, only those connected with that trade may enter.

While this policy seems quite general there is a tendency in some schools to permit any student to enter a technical course, regardless of his previous training, provided he impresses the authorities with his sincerity of purpose. It should be understood that this attitude applies only to those who are entering for the first time. To enter the senior or advanced sections a student must fulfill all the requirements in regard to classwork and examinations.

The Scottish plan of having the elementary work done in affiliated schools in the smaller schools and of concentrating the advanced work in a central school in a larger city is worthy of the attention of those interested in vocational education in the United States. It is obvious that trade schools or technical schools can only be successful where there is a large population to draw upon. If each of our larger cities could be made a center into which the prospective tradesmen from the surrounding territory could be drawn, we would have more effective use of the large plants usually found in the technical schools of those centers. Another advantage would be that the necessity for establishing smaller and less effective trade school plants in smaller communities would be eliminated. Furthermore the young workers in those communities would have the advantage of a larger and better-equipped school and a better-trained teacher than would be possible in the smaller towns. It is true that the problem of transportation would be a serious one, to say nothing of the further problem of inducing the young people to travel to school. However, when we remember that it would only be the more advanced and more ambitious students who would have to go into the city, this latter difficulty might not be so great.

Whether one agrees with the system or not, one who has seen it in operation cannot but concede that it offers a direct road — although lengthy — for the ambitious young worker to secure a technical education of the highest rank.

VOCATIONAL GUIDANCE

Vocational guidance is concerned with helping children to choose, prepare for, enter upon and make progress in their careers, and in furnishing children with such vocational enlightenment as will equip them to solve coöperatively the larger problems of occupational life which cannot be solved by individuals alone. Vocational guidance is important, for one reason, because our vocations occupy about one half of our waking time of an ordinary day, and also because success or failure in one's vocation is intimately connected with the welfare of his total activity. — *John M. Brewer.*

Modern Methods in the Teaching of Printing and Typography—II

*Arnold Levitas**

The Job Sheet or Lesson Sheet

Another important matter that has developed lately in the teaching of trade subjects is the job sheet and the lesson sheet, which give the student an opportunity to work by himself, with comparatively little help from the instructor.

There are several advantages to this plan. First, it makes it possible for the teacher in the classroom to take care of students of various grades at the same time, because each one will have a job sheet and a lesson sheet, fitted to his particular needs and ability. Secondly, it makes it easy for each student to progress and develop in accordance with his own intelligence and without being dependent upon others. Third, the teacher can take care of a greater number of students than would be possible if he had to give individual instruction without the use of these sheets to each one of his students.

In some schools, like the continuation and evening schools, where students enter all through the year, a device like the job sheet or lesson sheet is a necessity, and effective instruction could not be given without them. These sheets will, however, be found of great advantage in other types of schools.

*Instructor of printing and typography in the Public Schools of New York.

SAMPLE JOB SHEET FOR SHOPWORK

Unit A Lesson 8

CENTRAL PRINTING TRADES CONTINUATION SCHOOL

JOB SHEET

Composition

Topic: Setting Two Paragraphs.

Aim: To learn how to set straight-matter type.

Practical Value:

Much straight matter is still set by hand, and a job compositor cannot get along without a knowledge of straight-matter composition. In fact, straight-matter work is so nearly related to display composition, that it has to be acquired as a preliminary study before the other can be attempted.

Equipment Necessary:

California Job Case, with 10-pt. Type
Composing Stick
Leads and Slugs, 18 picas long.

Instruction Outline:

The composing stick should be held in the left hand, and type is to be set with the right hand. As each letter is placed next to the preceding one, the thumb of the left hand closes over the last letter, holding the line firmly and in place.

The type is to be set with the face on top and with the nick or nicks out in even rows. When the line is finished, it is tightened, by spacing, and a lead (thin piece of metal, covering the whole line) is placed over the line, separating this line from the following line.

In this lesson, several lines are brought together to form a paragraph. This is continuous reading matter, in which the lines are connected. The punctuation is in accordance with the sense of the text, and not at the end of each line.

Project (What to Do):

Adjust the composing stick to 18 picas, as was done in previous lessons.

After the composing stick has been adjusted, set the job in accordance with the copy given here.

Copy of Matter to Be Set:

The educational value of printing has secured its introduction into the schools of the country. This value is based upon the general principles which are the foundation of all other subjects in the school curriculum.

Printing, whether used as an aid in cultural training or as a subject in manual training, has such unbounded qualifications that one hesitates to attempt a detailed description of its educational possibilities. To attempt such a description means to delve into an area that is beyond human conception.

—

First place an em quad in the stick; then the capital letter. Place a 3-em space after each word. When the line is too short or too long, change the 3-em spaces to larger or smaller spaces, one at a time, until the line is even. Each line is respaced in the same manner. Use a 1-em quad at the end of sentence within a paragraph. When the whole word does not fit on the line, the word may be broken on a syllable. Never place a space at the end of a line.

At the end of a paragraph use large quads, both sizes, to fill in blank space. If small space is needed to make line tight, choose one or two that fit and place them next to the period.

Put an 18-pica lead after each line that has been set. After the job has been set it is lifted out of the stick, placed on a galley, and tied up.

A proof is to be pulled after the job is tied up; and the proof is then read, and corrections are marked.

Questions (Answer the following questions):

1. How may the lines of a paragraph be made even?
2. How much space is to be used between sentences within a paragraph?
3. Where are the small spaces at the end of a paragraph to be placed?

Suggested Readings: None.

Related Academic Instruction: Spelling.

SAMPLE LESSON SHEET FOR MAJOR ACADEMIC SUBJECT

Unit C Lesson 4

CENTRAL PRINTING TRADES CONTINUATION SCHOOL

INSTRUCTION SHEET

Proofreading

Topic: Proofreading.

Aim: To learn how to find the mistakes and to mark them on the proof.

Practical Value:

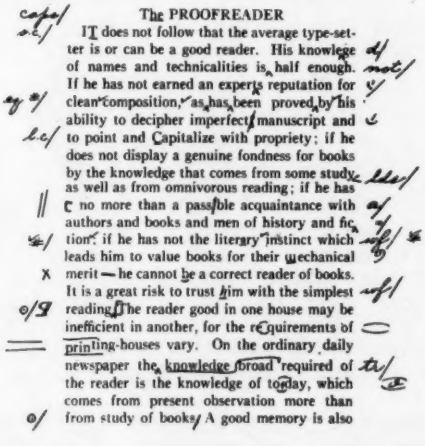
In order to make the corrections on a job, it is necessary to find the errors on the proof first. The corrections are made from the proof. Therefore, the compositor must know something about proofreading.

Instruction Outline:

After the type matter has been set up, either by hand or by machine, a proof is pulled and sent in to the proofreader. The proofreader reads the proof, marks the corrections in the margin, and returns it to the compositor who makes the corrections from the proof.

Illustration:

In the illustration below is shown a proof which has been read and marked by the proofreader.



The PROOFREADER

IT does not follow that the average type-setter is or can be a good reader. His knowlege of names and technicalities is a half enough. If he has not earned an experts reputation for clean composition, as has been proved by his ability to decipher imperfect manuscript and to point and Capitalize with propriety; if he does not display a genuine fondness for books by the knowledge that comes from some study as well as from omnivorous reading; if he has no more than a passible acquaintance with authors and books and men of history and fiction; if he has not the literary instinct which leads him to value books for their mechanical merit — he cannot be a correct reader of books. It is a great risk to trust him with the simplest reading. The reader good in one house may be inefficient in another, for the requirements of printing-houses vary. On the ordinary daily newspaper the knowledge broad required of the reader is the knowledge of today, which comes from present observation more than from study of books. A good memory is also

Project (What to Do):

Following the marked-up proof, and using it as a guide:

1. Mark the attached proof as nearly like the proof in the illustration as possible.

The PROOFREADER

IT does not follow that the average type-setter is or can be a good reader. His knowlege of names and technicalities is a half enough. If he has not earned an experts reputation for clean composition, as has been proved by his ability to decipher imperfect manuscript and to point and Capitalize with propriety; if he does not display a genuine fondness for books by the knowledge that comes from some study as well as from omnivorous reading; if he has no more than a passible acquaintance with authors and books and men of history and fiction; if he has not the literary instinct which leads him to value books for their mechanical merit — he cannot be a correct reader of books. It is a great risk to trust him with the simplest reading. The reader good in one house may be inefficient in another, for the requirements of printing-houses vary. On the ordinary daily newspaper the knowledge broad required of the reader is the knowledge of today, which comes from present observation more than from study of books. A good memory is also

2. Copy the reading matter in the proof; but write it as it would appear after the job had been corrected.

Questions (Answer the following questions):

1. What is the object of proofreading?
2. How will a knowledge of proofreading help the compositor?

Suggested Readings:

Proofreading, by Arnold Levitas — U.T.A.

Copy Preparation, by Arnold Levitas — Roy Press.

Related Academic Instruction: Correcting Type Matter.

Illustrations of Job Sheets and Lesson Sheets

It is usual to have job sheets for the shopwork and lesson sheets for the correlated academic work. An illustration of each are herewith shown. The lesson sheet is usually used for the major academic subjects, while the minor academic subjects are taught by means of mass instruction. A lesson plan for guiding the teacher in the minor academic subjects will be found very useful, and an example of such a lesson plan is also included in that which follows.

A Course of Study

In the modern trade it is best not to take up too many subjects at the same time. Three subjects a day is all that is necessary; and the unit system might be followed to good advantage. While the first unit of Composition is given in the shop, a unit of English, consisting of Proofreading, may be given as a major academic subject; and for the minor subject, a unit in printing history and civics may be used.

A course of study for four years in shopwork and related academic work would consist of the following units:

Course of Study

SHOPWORK

First Year

Unit A — Elementary Composition

Lesson 1. Learning the Type Case (Lower Case)
Lesson 2. Learning the Type Case (Capitals and Other Characters)
Lesson 3. Setting Words
Lesson 4. Setting Lines
Lesson 5. Correcting Type Matter (Simple Lines)
Lesson 6. Distributing Type Matter (Simple Straight Matter)
Lesson 7. Setting a Paragraph
Lesson 8. Setting Two Paragraphs
Lesson 9. Setting Type Matter with Heading
Lesson 10. Setting Smaller Type

Unit B — Advanced Composition

Lesson 1. Correcting Type Matter (Advanced)
Lesson 2. Correcting Type Matter (Advanced)
Lesson 3. Hand Composition (Straight Matter — Simple)
Lesson 4. Hand Composition (Straight Matter — Advanced)

SAMPLE LESSON PLAN FOR MINOR ACADEMIC SUBJECT

Time — 1:05 to 1:40
2:55 to 3:25

SCHOOL
CENTRAL PRINTING TRADES CONTINUATION
LESSON PLAN

The Advent of the Printing Press

Week of April 22 to 26 Arnold Levitas

Aim: To give young people desiring to become printers some information about the early forms of printing.

Approach: It is interesting to know how this great industry of printing had its beginnings; how the press, which has developed to such wonderful proportions, did printing in the early days.

What kind of printing was done before the modern press was developed?

Application:

1. Earliest Days — Many thousands of years ago
   Recording on stone
   Monuments, Obelisks
2. Assyria, Babylonia, Chaldea
   Tablets of clay — about 4,000 years ago
   Wax impressions
3. Later Developments
   Greece — Works of Homer on skin of serpents; engraving
   Rome — Ivory, wood, bark of trees
   Egypt — Paper originated from papyrus plant
   Central Europe — Paper from wood and rags (sixth century)
4. Early Specimens of Writing — Sixth to thirteenth centuries
   Church people had all learning
   Copying manuscripts
5. Block Printing — Wooden blocks
   Originated in China
   Marco Polo — Eleventh century
6. Origin of Alphabet
   Phoenicians
   Greek development
   Roman development
7. Invention of Movable Types
   Coster — Harlem, Holland
   Gutenberg — A.D. 1440 (engraver)
8. Gutenberg's Press
   Wooden Lever Press — A.D. 1450
   Printed Bible

Test Questions

1. What forms of recording were practiced in the earliest days of civilization?
2. What kind of engraving was done by the Assyrians and Babylonians?
3. How were the clay tablets and wax tablets prepared?
4. What kind of material did the Romans use for their recording?
5. Where did paper first originate, and how was it made?
6. When and where was paper first made from wood and rags?
7. How did the alphabet originate?
8. Who helped in the development of the alphabet?
9. Who were the people responsible for the invention of movable type, and how was it invented?
10. What kind of press did Gutenberg use, and how was it constructed?

Lesson 5. Hand Composition (Centering Lines)
Lesson 6. Hand Composition (Setting Poetry)
Lesson 7. Distribution (Simple Straight Matter)
Lesson 8. Distribution (Several Faces)
Lesson 9. Hand Composition (Tabular Matter)
Lesson 10. Hand Composition (Tabular Matter)

Unit C — Simple Stonework
Lesson 1. Learning the Tools on the Stone
Lesson 2. Locking Up Simple Business Card
Lesson 3. Locking Up Letterhead
Lesson 4. Locking Up One-Page Circular
Lesson 5. Locking Up Two-Page Circular
Lesson 6. Locking Up One-Page Foundry Job
Lesson 7. Locking Up Two-Page Foundry Job
Lesson 8. Locking Up Three-Page Foundry Job
Lesson 9. Locking Up Four-Page Foundry Job
Lesson 10. Locking Up Four-Page Job for Press

Unit D — Display Composition
Lesson 1. Setting Envelope Corner (Simple)
Lesson 2. Setting Envelope Corner (Advanced)
Lesson 3. Setting Business Card (Simple)
Lesson 4. Setting Business Card (Simple)
Lesson 5. Setting Business Card (Advanced)
Lesson 6. Setting Letterhead (Simple)
Lesson 7. Setting Letterhead (Simple)
Lesson 8. Setting Letterhead (Advanced)
Lesson 9. Setting Package Label (One Color)
Lesson 10. Setting Package Label (Two Colors)

Second Year

Unit E — Advanced Display Composition (10 Lessons)
Unit F — Elementary Ad Composition (10 Lessons)
Unit G — Advanced Ad Composition (10 Lessons)
Unit H — Advanced Stonework (10 Lessons)
4-, 8-, 16-Page Forms

Third Year

Unit I — Linotype Operating — Elementary (10 Lessons)
Unit J — Linotype Operating — Advanced (10 Lessons)
Unit K — Advanced Display Composition — Original Work (10 Lessons)
Unit L — Advanced Stonework (10 Lessons)
8-, 16-, 32-Page Forms

Fourth Year

Unit M — Monotype Operating — Elementary (10 Lessons)
Unit N — Monotype Operating — Advanced (10 Lessons)
Unit O — Presswork — Elementary (10 Lessons)
Unit P — Presswork — Advanced (10 Lessons)

Course of Study

Correlated Academic Work

First Year

Unit A — Printers' English (Elementary)
Lesson 1. The Study of Words (Words Similarly Pronounced)
Lesson 2. The Study of Words (Words Similarly Pronounced)
Lesson 3. The Study of Words (Similar Words)
Lesson 4. The Study of Words (Similar Words)

Lesson 5. Word Study (Meaning of Words)
Lesson 6. Word Study (Plurals)
Lesson 7. Word Study (Plurals)
Lesson 8. Word Study (Endings, Suffixes)
Lesson 9. Word Study (Endings, Suffixes)
Lesson 10. Word Study (Words in Present and Past Tense)
Unit B — Proofreading
Lesson 1. Proofreaders' Marks (Elementary Marks)
Lesson 2. Proofreaders' Marks (Advanced Marks)
Lesson 3. Proofreaders' Marks (Test)
Lesson 4. Proofreading (Simple Straight Matter)
Lesson 5. Proofreading (Straight Matter)
Lesson 6. Proofreading (Advanced Straight Matter)
Lesson 7. Proofreading (More Difficult Straight Matter)
Lesson 8. Proofreading (More Difficult Straight Matter)
Lesson 9. Proofreading (Poetry)
Lesson 10. Proofreading (Small Type Matter)
Unit C — Printers' Arithmetic
Lesson 1. Spacing (Points in Various Spaces — 6-Point to 14-Point)
Lesson 2. Spacing (Points in Various Spaces — 14-Point to 48-Point)
Lesson 3. The Point-System (The Pica and the Inch)
Lesson 4. The Point-System (Ems of Various Kinds)
Lesson 5. The Point-System (Points and Ems in Pica and Inch)
Lesson 6. Computing Space (Ems in Given Area)
Lesson 7. Computing Space (Ems in Given Area)
Lesson 8. Computing Space (Ems in Booklet)
Lesson 9. Computing Space (Ems in Booklet)
Lesson 10. Computing Space (With Leads)
Unit D — Printers' Drawing and Design
Lesson 1. Lettering Roman Type Faces
Lesson 2. Lettering Italic Type Faces
Lesson 3. Lettering 36-Point Roman and Italic
Lesson 4. Lettering 18-Point Roman and Italic
Lesson 5. Lettering 12-Point Type-Faces
Lesson 6. Making a Diagram of Type-Case (Imitation)
Lesson 7. Making a Diagram of Type-Case (Original)
Lesson 8. Layout of Business Card (Simple)
Lesson 9. Layout of Business Card (Advanced)
Lesson 10. Layout of Letterhead (Simple)

Second Year

Unit E — Printers' English (Punctuation)
Unit F — Proofreading (Advanced)
Unit G — Printers' Arithmetic (Advanced)
Unit H — Printers' Drawing and Design (Advanced Commercial Work)

Third Year

Unit I — Printers' English (Capitalization, Division of Words, etc.)
Unit J — Proofreading (Display Work and Revising)
Unit K — Printers' Arithmetic (Cost Estimating)
Unit L — Printers' Drawing and Design (Layout of Ads)

Fourth Year

Unit M — Printers' English (Copy Preparation and Editing)
Unit N — Proofreading (Final Reading — Foundry, Stone, Press)
Unit O — Printers' Arithmetic (Advanced Cost Estimating)
Unit P — Printers' Drawing and Design (Advanced Layout of Ads)

Correlated Academic Work — Minor Subjects

Science, History and Civics, Economics, Industrial Hygiene

First Year

Unit A — Equipment and Tools (Science)
Lesson 1. How Type Is Made — I
Lesson 2. How Type Is Made — II
Lesson 3. Making of Paper — I
Lesson 4. Making of Paper — II
Lesson 5. Making of Printers' Ink
Lesson 6. The Linotype
Lesson 7. The Monotype
Lesson 8. Electrotyping and Stereotyping
Lesson 9. Photo-Engraving
Lesson 10. The Printing Press
Unit B — The Printing Industry (Economics)
Lesson 1. Organization in the Printing Industry
Lesson 2. Materials and Necessities
Lesson 3. Administration in the Printing Industry
Lesson 4. Production in Printing
Lesson 5. Conservation
Lesson 6. The Modern Printing Shop
Lesson 7. Associations of Master and Working Printers
Lesson 8. The Printing Industry in the United States
Lesson 9. Printing as a Business
Lesson 10. The Young Man's Opportunities in the Printing Trade
Unit C — History and Civics
Lesson 1. History of Printing
Lesson 2. Place of Printing in American Industries
Lesson 3. Gutenberg and His Achievements
Lesson 4. America's Contribution to the Development of Printing
Lesson 5. The Life of Benjamin Franklin
Lesson 6. Prominent Contemporary Printers and Their Contribution
Lesson 7. The Advent of the Printing Press
Lesson 8. Early Printing Presses
Lesson 9. Old and New Apprenticeship Training
Lesson 10. Important Labor Laws
Unit D — Industrial Hygiene
Lesson 1. Preparing for the Day's Work
Lesson 2. Good Habits for the Worker
Lesson 3. Clothing for the Worker
Lesson 4. Food and Drink — I
Lesson 5. Food and Drink — II
Lesson 6. Alcohol and Tobacco
Lesson 7. The Noon-Hour
Lesson 8. Hygiene of the Workroom
Lesson 9. First Aid — I
Lesson 10. First Aid — II

Second Year

Unit E — Science in the Printing Trades
Unit F — Economics of the Printing Trades
Unit G — History and Civics — Advanced I
Unit H — Industrial Hygiene

Third Year

Unit I — Science in Printing — Advanced
Unit J — Economics of Printing — Advanced
Unit K — History and Civics — Advanced II
Unit L — Industrial Hygiene — Advanced

Fourth Year

Unit M — Science in Printing — Experiments and New Inventions
Unit N — Economics of Printing — Business Methods and Administration
Unit O — Civics — Applied to Trade and Social Affairs
Unit P — Hygiene — First Aid

Trade-Testing in Shopwork and Academic Work

After about ten weeks of instruction, it is advisable to test the students in both shopwork and correlated academic subjects. For this purpose, simple test questions are prepared covering the various subjects studied. These questions are to be arranged with four possible answers, so that the student may indicate, with a check mark, which one of the four answers he considers the right one.

Sample Test Questions

66. An initial is usually used for
    a) emphasis *c*) illustration
    b) information *d*) decoration

67. A border around an advertisement is used for
    a) emphasis *c*) finish
    b) illustration *d*) strength
68. The largest size of type in an advertisement is to be used for the
    a) head *c*) foot
    b) body *d*) panel
69. The largest size of type in a business card should be used for the
    a) name *c*) business
    b) address *d*) telephone
70. The smallest size of type in a letterhead should be used for the
    a) name *c*) business
    b) address *d*) telephone
71. The foreman of the composing room usually
    a) sets type *c*) reads proof
    b) supervises *d*) does stonework
72. The study most useful for the compositor is
    a) English *c*) drawing
    b) arithmetic *d*) History
73. In English, the most important knowledge for a compositor to acquire is
    a) capitalization *c*) spelling
    b) composition *d*) abbreviation
74. In spelling, the most important part for the compositor to learn are the words
    a) in medical use
    b) in domestic use
    c) in commercial use
    d) in legal usage
75. The most important reason why a knowledge of proofreading is helpful to the compositor is that
    a) it shows him how to correct the job
    b) it helps him in his knowledge of English
    c) it makes him avoid future mistakes
    d) it makes it possible for him to become a proofreader

After ten more weeks of study, the student may again be tested, this time for some special qualifications, to find what particular branch of the printing trade he would be best fitted for. For that purpose, tests specially prepared for the various branches are used. An outline, showing what special tests may be prepared for the purpose in question, follows:

Special Tests

1. *The Job Compositor*
   a) Spelling test — spelling, word formation, word endings
   b) Book-knowledge test — books, authors
   c) Typographical test — typographic taste, interpreting type
   d) Typographic intelligence — typographical information, typographical understanding
2. *The Linotype and Monotype Operators*
   a) Mechanical test — knowledge of machinery, mechanical intelligence
   b) Spelling test — Spelling, word formation, word endings
3. *The Proofreader*
   a) Spelling test — Spelling, word formation, word endings
   b) English test — construction of sentence, meaning of words
   c) Book knowledge test — books, authors
   d) Proofreading test — ability for finding mistakes, ability to edit copy
4. *The Stoneman*
   a) Mechanical test — mechanical intelligence
   b) Mathematical ability test — ability with figures, perception
5. *The Pressman*
   a) Mechanical test — knowledge of machinery, mechanical intelligence
   b) Patience test — feeding on press
   c) Industry test — liking for the work, application for the work

Although great strides have been made in the progress of teaching printing, much is as yet left to be learned and tried. It can be said with all sincerity, however, that progress is being made and that an acceptable goal is being approached with reasonable speed.

Study of Courses and Equipment of a General Metal Shop

*J. W. Schell**

Introduction

THE general metal shop is a comparatively new form in the schools of this country, although it was one of the oldest forms of shop in the industrial field. The specialized forms of today have grown out of the general shop, each unit expanding into a department.

The early shops or factories usually consisted of a machine shop, blacksmith shop, and foundry combined. Generally, the machinists were called upon to assist in the pouring of the metal in the foundry unit. Even today we find general shops with the following combinations:

1. The village or small-town blacksmith shop is a combination of forge shop, welding shop, and a crude machine shop.

2. The best garages of smaller towns usually are a combination of garage, forge shop, welding shop, and machine shop.

3. The small contract shop in large cities is usually a combination of machine shop, welding shop, forge shop, and a heat-treating shop. Even the larger factories usually have one or more of these general shops, under the head of experimental department or maintenance and repair department. In the former, the department generally consists of a machine shop, a welding, and a heat-treating unit with a nonferrous metal-

*Instructor Sheet Metal, Washington High School, Indianapolis, Indiana.

Table No. 1

Express your ideas as to what a general shop course taught by one teacher in one class room all subjects running simultaneously, should include, by filling out the table below.

		Class period	Sheet metal	Forging	Acetylene welding	Electric Welding	Operation of foot tools	Elementary foundry (including the pouring of low melting metals)	Machine shop No. 1	Machine shop No. 2	Machine shop No. 3	Automobile repair	Any other course
I.	Indicate by number the order used to rotate the pupils though the courses in your shop.												
II.	Indicate the number of pupils you have per period in each course listed.	1st											
		2nd											
		3rd											
		4th											
III.	Indicate by number the order you would use to rotate pupils through the courses you believe should be given in a general metal shop.												
IV.	Indicate the number per period of pupils you would have in each of the courses selected in quest. No. 3												
V.	If you were to organize the courses above with limited funds for additions each year; indicate by number the order of your addition of units.												
VI.	Indicate the total number of hours you believe each course should last	Total length class period											
		Days per week											
		Total number weeks											
		Total minutes											

Remarks: _____

Fill out the following tables of tools and equipment, for courses you have included in table No. 1. Noting the numbers of tools and machines you have, or would like to have, in the columns below, according to the heading of each column.

Table No. 2 Sheet Metal

Name of Machine or Tool	Col. No. I If you have a preference state make of mach. or tool you prefer	Col. No. II No. of machines you have at present	Col. No. III Size of machines	Col. No. IV No. machines you think you should have	Col. No. V Sizes machines listed here for Col. No. IV
Squaring shears					
Circular shears					
Cornice Break					
Box and pan break					
Bar folder					
Groving machine					
Forming rolls					
Burring machine					
Turning machine					
Wiring machine					
Setting down machine					
Beading machine					
Handy seaming tongs					
Gas furnace					
Stake plates					
Hollow mandrel					
Solid mandrel					
Beakhorn stake					
Blowhorn stake					
Conductor stake					
Hatchet stake					
Square stake					
Bottom stake					
Double seaming stake					
Creasing with horn stake					
Candle mold stake					
Needle case stake					
Hollow punches ⅜ x 1½					
Solid punches 5-10					
Prick punches 00-4					
Lever punch					
Rivet sets 00-8					
Rivet hammers					
Set hammers					
Raising hammers					
Mallets					
Groving tools 000-8					
Soldering Coppers plain					
Soldering Coppers hatchet					
Soldering Coppers bottom					
Wing dividers					
Trammels					
Scratch awls					
Rules Steel 2 ft.					
Circumference rule 3 ft.					
Metal guage					

Table No. 2 (continued)

Name of machine or tool	Col. No. I If you have a preference state make of mach. or tool you prefer	Col. No. II No. of machines you have at present	Col. No. III Size of machines	Col. No. IV No. machines you think you should have	Col. No. V Sizes machines listed here for Col. No. IV
Snips Straight					
" circular					
" hawk bill					
" stove pipe					
" combination scroll					
Bench shears					

Table No. 3.
Forging

Forges					
Anvils					
Tongs bolt					
" gad					
" lathe tool					
" double pick up					
" rivet					
" straight lipped					
Top fullers					
Bottom fullers					
Top swagers					
Bottom swagers					
Hardies					
Flatters					
Set hammers					
Cold cutters					
Hot cutters					
Round punches					
Sledge hammers					

Table No. 4.
Acetylene Welding

Torches					
Clamps					
Tables					
Goggles					

Electric Welding

Welding machines					
Clamps					
Tables					
Masks					

Table No. 5.
Heat Treating

Name of machine or tool	Col. No. I If you have a preference state make of mach. or tool you prefer	Col. No. II No. of machines you have at present	Col. No. III Size of machines	Col. No. IV No. machines you think you should have	Col. No. V Sizes machines listed here for Col. No. IV
Oil burning furnaces					
Gas furnaces					
Metal boxes					
Tongs					

Table No. 6.
Foundry

Flasks					
Shovels					
Riddles					
Rammers					
Bellows					
Finish trowels					
Bench lifters					
Sticks					
Screw pins					
Rapping pins					
Crucibles					
Melting pots					
Melting furnaces					

Table No. 7.
Machine shop

Lathes engine					
Lathes turrett					
Shapers					
Millers plane					
Millers universal					
Cutter grinder					
Surface grinders					
Cylinder grinders					
Lathe tools					
Lathe chuck independent					
Lathe chuck universal					
Drill chuck extra					
Armstrong tool holders S					
" " " L					
" " " R					

FIG. 1 (Continued on next page)

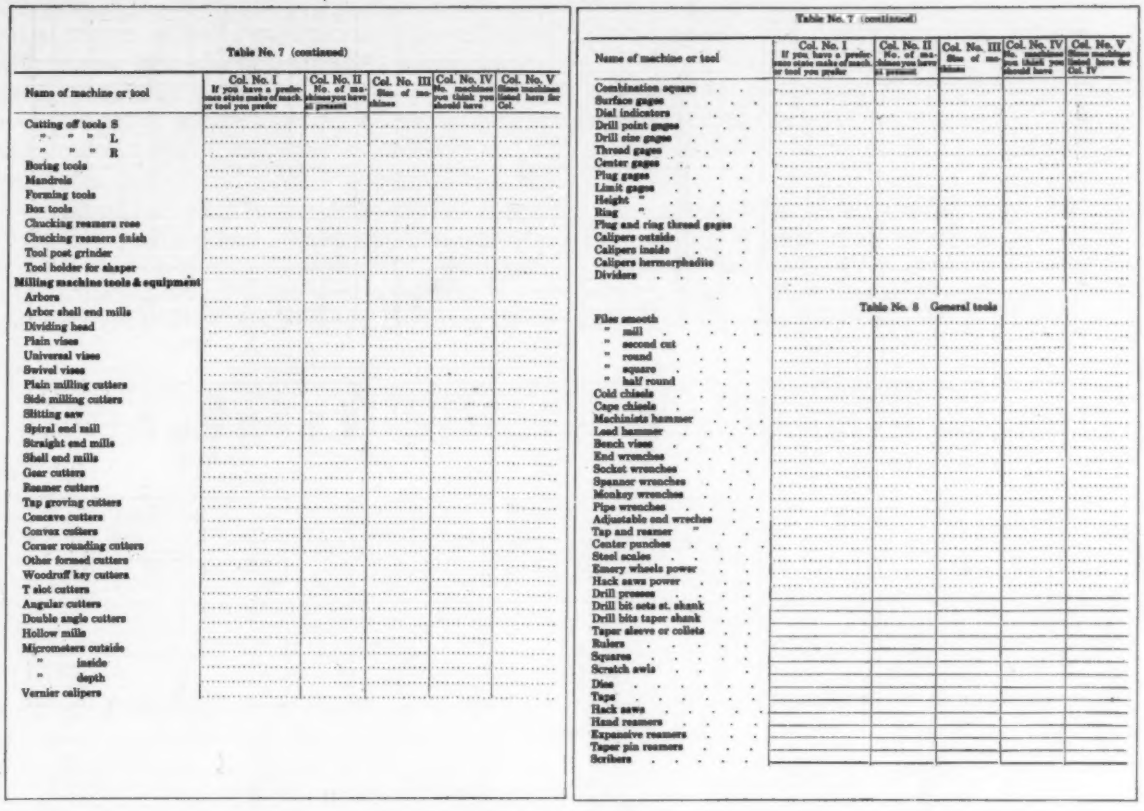


Table No. 7 (continued)

Name of machine or tool	Col. No. I If you have a preference state make of mach. or tool you prefer	Col. No. II No. of machines you have at present	Col. No. III Size of machine	Col. No. IV No. machines you think you should have	Col. No. V Sizes machines listed here for Col.
Cutting off tools S					
" " " L					
" " " R					
Boring tools					
Mandrels					
Forming tools					
Box tools					
Chucking reamers rose					
Chucking reamers finish					
Tool post grinder					
Tool holder for shaper					
Milling machine tools & equipment					
Arbors					
Arbor shell end mills					
Dividing head					
Plain vises					
Universal vises					
Swivel vises					
Plain milling cutters					
Side milling cutters					
Slitting saw					
Spiral end mill					
Straight end mills					
Shell end mills					
Gear cutters					
Reamer cutters					
Tap groving cutters					
Concave cutters					
Convex cutters					
Corner rounding cutters					
Other formed cutters					
Woodruff key cutters					
T slot cutters					
Angular cutters					
Double angle cutters					
Hollow mills					
Micrometers outside					
" inside					
" depth					
Vernier calipers					

Table No. 7 (continued)

Name of machine or tool	Col. No. I If you have a preference state make of mach. or tool you prefer	Col. No. II No. of machines you have at present	Col. No. III Size of machine	Col. No. IV No. machines you think you should have	Col. No. V Sizes machines listed here for Col. IV
Combination square					
Surface gages					
Dial indicators					
Drill point gages					
Drill size gages					
Thread gages					
Center gages					
Plug gages					
Limit gages					
Height "					
Ring "					
Plug and ring thread gages					
Calipers outside					
Calipers inside					
Calipers hermorphadite					
Dividers					

Table No. 8 General tools

Files smooth					
" mill					
" second cut					
" round					
" square					
" half round					
Cold chisels					
Cape chisels					
Machinists hammer					
Lead hammer					
Bench vises					
End wrenches					
Socket wrenches					
Spanner wrenches					
Monkey wrenches					
Pipe wrenches					
Adjustable end wreches					
Tap and reamer "					
Center punches					
Steel scales					
Emery wheels power					
Hack saws power					
Drill presses					
Drill bit sets st. shank					
Drill bits taper shank					
Taper sleeve or collets					
Rulers					
Squares					
Scratch awls					
Dies					
Taps					
Hack saws					
Hand reamers					
Expansive reamers					
Taper pin reamers					
Scribers					

FIG. 1 (Concluded)

melting furnace. In the latter case the department generally consists of a machine and forge shop, and sometimes a welding shop.

In order to get exact information on the general metal shops in the schools of this country regarding the courses taught, and the equipment necessary for teaching such courses, the questionnaire shown in Figure 1 was sent to 200 supervisors and instructors of high schools and junior high schools throughout the country.

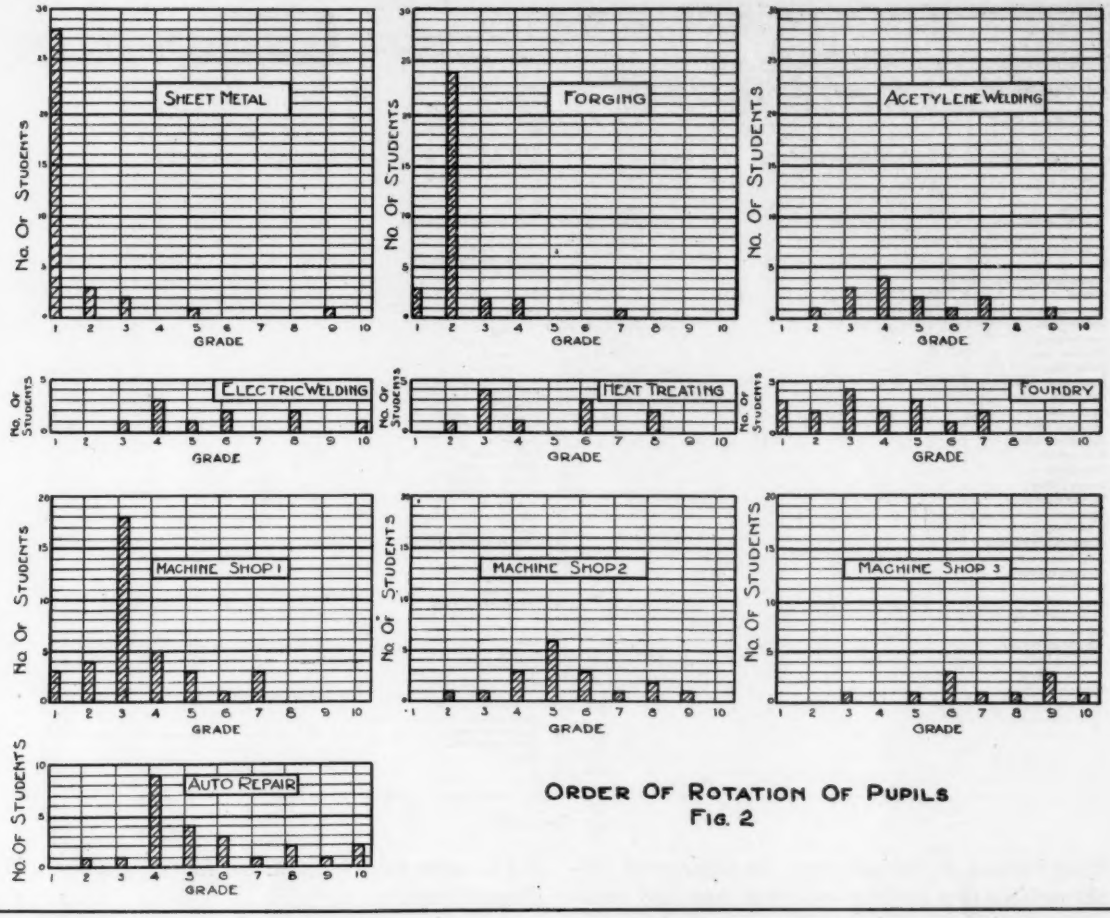
Of this group, 51 filled out questionnaires complete enough to be used in this study. Thirty-two of the remaining answered, but gave no information. The data compiled were obtained from supervisors and instructors in the high schools or junior high schools, and in some cases both, in the following cities of the United States.

Marion, Ind.	Tulsa, Okla.*
Richmond, Ind.	Oxford, Ohio
Kansas City, Mo.	Kent, Ohio
Talequah, Okla.	Enid, Okla.
Joliet, Ill.	Washington, Pa.
Ft. Wayne, Ind.	Buffalo, N. Y.
Hammond, Ind.	Circleville, Ohio
Amsterdam, N. Y.	Carbondale, Ill.
Commerce, Texas	Stillwater, Okla.
LaSalle, Ill.	Bronxville, N. Y.
San Antonio, Texas*	Hamtramck, Mich.
Muncie, Ind.	South Bend, Ind.
Peru, Nebr.	Lansing, Mich.
Terre Haute, Ind.	Bloomington, Ind.

*Cities from which more than one school sent data.

TABLE I. Order of Rotation of Pupils Through the Courses in the General Metal Shops

Name of Shop	*Number of Schools Selecting Each Place of Rotation*										*Total No. of Schools Offering the Courses*
	1st	*2nd*	*3rd*	*4th*	*5th*	*6th*	*7th*	*8th*	*9th*	*10th*	
Sheet Metal	28	3	2	0	1	0	0	0	1	0	35
Forging	3	24	2	2	0	0	1	0	0	0	32
Acetylene Welding	0	1	3	4	2	1	2	0	1	0	14
Electric Welding	0	0	1	3	1	2	0	2	0	1	10
Heat-Treating Furnace	0	1	4	1	0	3	0	2	0	0	11
Elementary Foundry	3	2	4	2	3	1	2	0	0	0	18
Machine Shop I	3	4	18	5	3	1	3	0	0	0	37
Machine Shop II	0	1	1	3	6	2	1	2	1	0	17
Machine Shop III	0	0	1	0	1	3	1	1	3	1	11
Auto Repair	0	1	1	9	4	3	1	2	1	2	24
Total Units for Each Place	37	37	37	29	21	16	11	9	7	4	



ORDER OF ROTATION OF PUPILS
FIG. 2

Findlay, Ohio
Madison, Wis.
Berkeley, Calif.
Buhl, Minn.
Santa Barbara, Calif.
Chicago, Ill.
Roslyn, Pa.
Beloit, Wis.
Denver, Colo.
Orlando, Fla.
Huntington Beach, Calif.
West Allis, Wis.
Grand Rapids, Mich.
Logansport, Ind.*
Houston, Texas*
Philadelphia, Pa.*
Athens, Ohio

The Rotation of Students in General Metal Shops

Table I shows not only the outstanding orders of rotation, but also the courses that are most popular in general metal shops. It will be noted that 35 schools have a sheet-metal course, 32 have forging, 18 have foundry, 37 have machine shop, and 24 have auto repair. It should be noted also that 17 included more than one course in machine shop.

There are a few prominent cases to be considered that are not shown in Table I. These cases are briefly stated here.

Madison, Wis. The class is divided into units but no definite rotation exists.

Cleveland, Ohio. All courses start simultaneously with no definite rotation followed.

Lansing, Mich. A pupil may begin anywhere in the cycle.

Richmond, Ind. Pupils rotate as individuals, not as units, with no definite order.

Hammond, Ind. No definite order of rotation, as the pupil chooses his own order of courses and has individual instruction.

In the foregoing instances the supervisors do not have any definite order of rotation of the students through the courses in the shop. The rest of the schools started the student at some specific place. From this point he progressed from one unit to another according to a definite scheme of rotation. The graphs in Figure 2, made from the data shown in Table I, bring out these ideas of rotation.

Thus, 28 schools out of 35 having sheet metal, placed it first. In forging, 24 of the 32 having the course placed it second, and it was the only outstanding second of the 37 choices in the table.

Machine Shop I has the only outstanding selection for third place, 18 out of 37 placing it so. While the placement of Machine Shop I is rather undecided, all schools contributing data for this table have Machine Shop I somewhere in their course, and at least fourteen of them have more than one course in it. Ten of these offer a third course in machine shop.

In auto repair there appears a more marked variation of placement, 9 being the largest number for any certain place. However, it has the largest placement for fourth place. In a shop rotation of 29 schools having 4 shops, there are 24 that have auto repair.

Machine Shop II has the largest placement for fifth place. Six out of 14 having the shop, have it as the fifth course. This is only 6 out of 21 having the five shops. There is no definite placing of any other courses, even though 18 schools offered a course in foundry. Only eleven schools offer acetylene welding, and 11 report the operation of a heat-treating furnace. Ten offer electric welding. The foregoing facts are charted in graph form in Figure 2. The graphs show a decided order of rotation as follows: Sheet metal first, forging second, machine shop I third, auto repair fourth, machine shop II fifth. Foundry is given in 50 per cent of the schools reporting, but is placed everywhere from first to seventh.

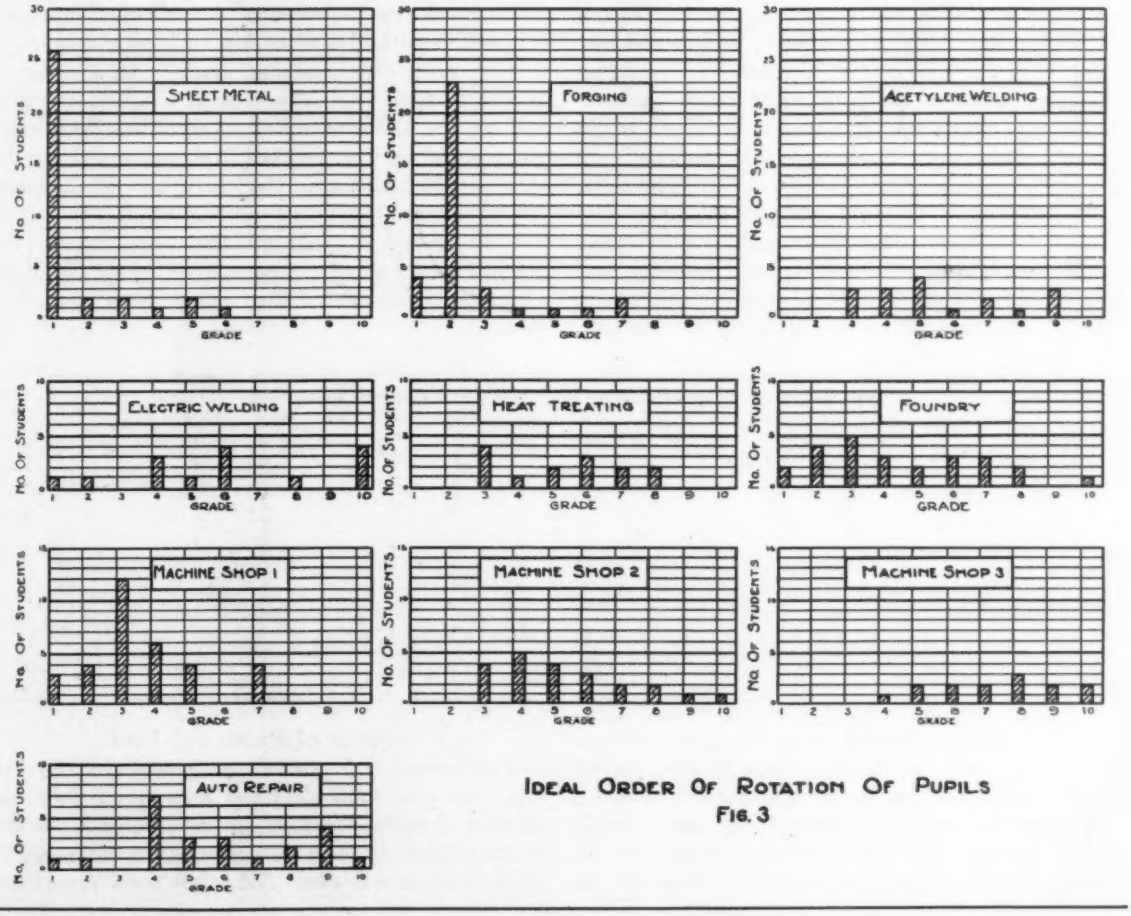
In three cases the schools reported on the present course and not on the ideal. In three cases the schools reported on the ideal and not the present. These six cases were taken into consideration in making the above table.

The Ideal Order of Rotating Pupils Through a General Metal Shop

The men who filled out the questionnaire also were asked to give an expression as to what they believed to be the ideal order of rotation for pupils taking their

TABLE II. Ideal Order of Rotation of Pupils Through the Courses in the General Metal Shop

Name of Shop	*Number of Schools Selecting Each Place of Rotation*										*Total*
	1st	*2nd*	*3rd*	*4th*	*5th*	*6th*	*7th*	*8th*	*9th*	*10th*	
Sheet Metal	26	2	2	1	2	1	0	0	0	0	34
Forging	4	23	3	1	1	1	2	0	0	0	35
Acetylene Welding	0	0	3	3	4	1	2	1	3	0	17
Electric Welding	0	1	0	2	1	4	0	1	0	4	13
Heat-Treating Furnace	0	0	4	1	2	3	2	2	0	0	14
Elementary Foundry	1	4	5	3	2	3	3	2	0	0	23
Machine Shop I	3	4	14	6	4	0	4	1	0	0	35
Machine Shop II	0	0	4	5	4	3	2	2	1	1	22
Machine Shop III	0	0	0	1	2	2	2	3	2	2	14
Auto Repair	1	1	0	7	3	3	1	2	4	1	23
Total Units for Each Place	35	35	35	30	25	21	18	13	10	8	



IDEAL ORDER OF ROTATION OF PUPILS
FIG. 3

TABLE III. Shows the Number of Schools Dropping a Course from Data in Table I and Those Adding a Course for Data in Table II

Name of Shop	*No. Schools Dropping Unit from Present Course*	*No. Schools Adding Unit to Ideal Course*	*Difference*
Sheet Metal	5	4	1
Forging	3	6	3
Acetylene Welding ...	3	6	3
Electric Welding	3	6	3
Heat-Treating Furnace	3	6	3
Elementary Foundry..	4	9	5
Machine Shop I.....	6	4	2
Machine Shop II.....	4	9	5
Machine Shop III....	4	7	3
Auto Repair	6	4	2

courses. Comparing Tables I and II shows that there were very few changes indicated, both in the courses selected or in the order of rotating pupils through them. The changes that do not appear in Table II are shown in Table III, which is a tabulation of the number of shops dropped and added to the original courses. The results of Tables I and II show a decided tendency to use sheet metal as a beginning course to be followed by a course in forging. The following data are also illustrated in graph form in Figure 3.

Of the 34 selecting sheet metal, 26 placed it first; and 23 out of 35 selecting forging placed it as the second course. The next shop with an outstanding placing is Machine Shop I. Fourteen out of 35 selected machine shop as a third course. The next highest figure appearing, occurs where 7 out of 23 placed auto repair fourth. The ideal rotation for the pupil would be sheet metal first, forging second, machine shop third, auto repair fourth, and foundry fifth. The shops having the largest number selecting the units first mentioned are named here in descending order. They are machine shop, forging, sheet metal, foundry, and auto repair. The data for this are found in the column of totals selecting the course, in Table II. Machine shop is outstanding in that the entire group selected at least one course in machine shop, 22 selected two courses, and fourteen wished to offer a third course.

The minor courses, acetylene welding, electric welding, and operation of the heat-treating furnace, all gained in numbers selecting them, but they did not have any definite placement in the course. The lack of a definite placement for these courses was due to the various combinations they formed with the other courses. This lack of definite placement is graphically shown in Figure 2.

Units Preferred for Starting Such a Shop and Order of Addition

The same group of men was asked to express the order in which they would add units to make up a general metal shop, where finances were limited and the shop had to be started with one unit. As shown in Table IV, only 21 out of 32 selecting sheet metal would use it as a beginning for a general metal shop. This was the largest selection for any unit in any place. The next largest number appearing was ten for forging, which located it as the second unit to be added to a general metal shop. Eight would add forging as a third unit, 9 would add machine shop II as a third unit, and 9 others would add machine shop II as a fourth unit. This is also shown in graph form in Figure 4. These figures seem to vary from the placement in the other two sections. When the factors that entered into the selections of courses here are considered, the above variations are explained. When funds are limited, the cost of equipment as well as the importance of the course is considered. As these courses vary greatly in cost, this would cause the above variation, as some would emphasize the economic aids more than others.

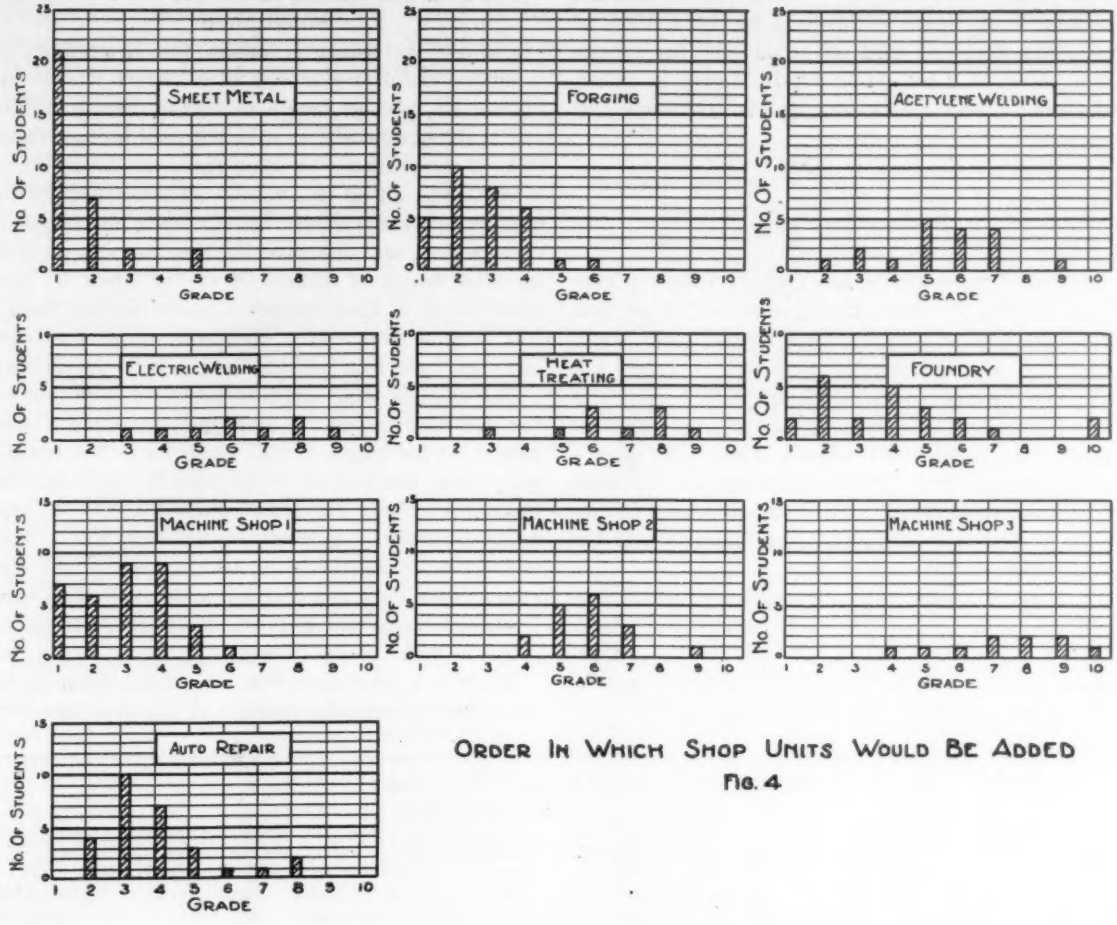
It will be noticed that the five most popular courses, namely, sheet metal, forging, machine shop, foundry, and auto repair, fall almost entirely within the first four choices. The three minor subjects, acetylene welding, electric welding, and heat-treating, would for the most part be added after the fourth unit. The greatest variation here is acetylene welding, where four out of the 18 choosing it would add this course before fifth place. This shows that these courses would be added as supplemental rather than major units of such a shop.

TABLE IV. Order of Adding Shop Units to a General Metal Shop

	1st	*2nd*	*3rd*	*4th*	*5th*	*6th*	*7th*	*8th*	*9th*	*10th*	*Total*
Sheet Metal	21	7	2	0	2	0	0	0	0	0	32
Forging	5	10	8	6	1	1	0	0	0	0	31
Acetylene Welding	0	1	2	1	5	4	4	0	1	0	18
Electric Welding	0	0	1	1	0	1	2	1	2	1	9
Heat-Treating Furnace	0	0	1	0	1	3	1	3	1	0	10
Elementary Foundry	2	6	2	5	3	2	1	0	0	2	23
Machine Shop I	7	6	9	9	3	1	0	0	0	0	35
Machine Shop II	0	0	0	2	5	6	3	0	1	0	17
Machine Shop III	0	0	0	1	1	1	2	2	2	1	10
Auto Repair	0	4	9	7	3	1	1	2	0	0	27
Total Units for Each Place.....	35	34	34	32	24	20	14	8	7	4	

Number of Pupils per Unit

The number of pupils per unit was derived by listing, both as a total class and as separate units, the number of pupils scheduled in each course in the different schools. In these data information from only 27 of the schools was used. The others were thrown out



ORDER IN WHICH SHOP UNITS WOULD BE ADDED

FIG. 4

TABLE V. Number of Pupils Reported in Each Class

School Number	*Sheet Metal*	*Forging*	*Acetylene Welding*	*Electric Welding*	*Operation Heat-Treating Furnace*	*Elementary Foundry*	*Machine Shop I*	*Machine Shop II*	*Machine Shop III*	*Auto Repair*	*Total No. in Class*
1	3	2	2		1	2	4	3	1	2	20
2	7	7			7	7	7				42
3	12	12					10				34
4	10	6				10	8				34
5		8					8			8	24
6	4	4	4				4	4		4	24
7	9	5					7	3			24
8	8	8					8			8	32
9	4	4					4			4	16
10	6	6					4			6	22
11	10					10	10				30
12	5	5					5			5	20
13	6	6					6	5		5	28
14	4	4	1				4			6	19
15	6	6					6			6	24
16	5	5					4			4	18
17	6						6			6	18
18	4						4			4	12
19	6	2			2	3	4	3	2	3	23
20		5				5	5			5	20
21	6	6					6				18
22	8	4				6	6	6		8	38
23	11	4				8	5			4	34
24	4	4					3			4	15
25	7	7					7				21
26	6	6					6				18
27	5	4					5	5		5	24
Totals	162	130	14		10	51	156	29	3	99	652
Average	6½	6½	3½		3 1/3	6 3/8	6	4	1½	5	24

either because of insufficient information, or because each unit made up an entire class by itself. Most of these data were not used on account of the former reason. Most of those listing pupils, it may be noted, had them in sheet metal, forging, machine shop, and auto repair.

25 out of 27 listed sheet metal
25 out of 27 listed forging
27 out of 27 listed machine shop
20 out of 27 listed auto repair

As these figures were taken entirely from the conditions as they now exist, they give slightly more data on the practical conditions in the general metal shops today. The average class for each unit is figured not only from the number having classes in that particular shop, but as the average of the total group, that is, figured on a basis of 27 schools. This would give a better comparison of what percentage of the total group work would be given over to such work as acetylene welding, electric welding, and operation of the heat-treating furnace.

Figuring this average by the number of shops having such units gives the average size of the classes actually to be found in the schools. This is one important part of the finding, as equipment must be based somewhat on the size of the class.

The Average Length of Course for a General Metal Shop

The average length of course was determined by compiling the data given by 32 of the 51 schools and finding the average length of course from that. The rest of the questionnaires were not used because of the lack of information. In some cases there was no information at all on this phase; some did not put the number of weeks; others failed to give the length of class period; and one gave the time as per cent with no total length of course. Of the 32 listed, 31 gave sheet metal, 30 gave forging, 32 gave machine shop I, and 23 gave auto repair. This again shows the popularity of these four courses for a general metal shop.

The average total length of course of each unit for the five most popular courses does not vary a great deal as to the length of course nor as to the average, which is 69 hours. This would make a 45-minute class for one semester. The three minor subjects, or what might be called supplementary courses, would work into a curriculum by giving two of them in one semester, as they average only 31 hours each. This gives the major trade courses twice the length of time that is given to the minor courses.

There is a great deviation from the average in the individual schools. An example of this is number 1 in

TABLE VI. Length of Course in Sixty-Minute Hours

Number	*Sheet Metal*	*Forging*	*Acetylene Welding*	*Electric Welding*	*Operation Heat-Treating Furnace*	*Elementary Foundry*	*Machine Shop I*	*Machine Shop II*	*Machine Shop III*	*Auto Repair*	*Total*
1	180	360	60	60	60	360	180	180	180	360	1,980
2	90	45				45	90			90	405
3	180	180				180	180	180	180	180	1,080
4	90	45	45				45	45		45	313
5	30	30	30		45		45	45		45	270
6	50	50					50			50	200
7	38	38					38			38	162
8	166	166					166			166	664
9	45	45					45			45	180
10	24					24	24				72
11	120	120					120			120	480
12	38	23	15			15	75	67		75	308
13	74	74	74				74			74	370
14	45	45					45			45	180
15	35	35					35				105
16	28	20				24	32			32	136
17	28	28	28	28	28	28	28			28	224
18	10	20					30	180	180	180	600
19	28						28			28	84
20	18	18	18			18	18	18			108
21	20	20			20	20	20	20	20	20	160
22	216	216					216				648
23	27	14				14	18	18		27	118
24	97	23				30	42				192
25	71	71					71			71	284
26	45	45				45	45				180
27	60	60	23	23	15	30	60				270
28	90	90					90			90	180
29	66	66					66			66	264
30		90	90				90	90		90	360
31	50	10	15	5	5	15	50	50	100	100	400
32	135	135					135				405
Total	2,194	1,882	398	115	173	848	2,251	938	660	1,885	
Average	71	63	39	29	29	60	70	78	132	82	364

Table VI. Here the class runs for a 2-hour period for 18 weeks in sheet metal and machine shop I, II, III; 36 weeks in forging, and auto repair; 6 weeks in acetylene welding, electric welding, and operation of the heat-treating furnace.

Number 3 and number 22 are also 2-hour courses. These bring up the average length of course, but compensate for numbers 18 and 20, where a fewer number of weeks are given to some of the courses.

Summary

1. The most popular courses in the general metal shops of the schools studied are machine shop, sheet metal, forging, auto repair, and elementary foundry. These are given in descending order.

2. Minor courses, or supplemental courses, are added to this group to vary or enrich such a course. These are acetylene welding, electric welding, and operation of the heat-treating furnace.

3. Pupils rotated through such a course usually follow the order below:

a) Sheet metal
b) Forging
c) Machine shop I
d) Auto repair
e) Foundry or machine shop II

4. The average-sized class in this type of shop is 24. The average for each unit is:

Sheet metal	6	Foundry	6
Forging	5	Acetylene welding	3
Machine shop I	6	Electric welding	0
Auto repair	5	Machine shop II	4
		Machine shop III	1

5. The average length of course for such a shop was one hour each day, five days a week for four semesters. The average length of each course follows:

Sheet metal	68 hours	Auto repair	77 hours
Forging	69 hours	Acetylene welding	37 hours
Machine shop I	70 hours	Electric welding	28 hours
Foundry	70 hours	Heat-treating	28 hours
		Machine shop II	62 hours

There was not enough information given about machine shop III to give a reliable average.

NO MISTAKE WEEK

R. P. Bell*

DID you every stop to think about the number of mistakes that you or one of the boys in your classes make in a week? If you want to have a real surprise, just make the experiment and jot down every one you make for one week.

Of course, everybody makes mistakes, but few do anything about correcting or eliminating them. Then too, many make mistakes while they are under the impression that they are doing things properly. In other words, they are not mistake-conscious.

In order to help the boys eliminate some of the mistakes which they are prone to make, we inaugurated a "No Mistake Week" in our machine shop. A chart was prepared listing each boy's name and also the days of the week. When a boy made a mistake it was recorded after his name. The rules of the contest were as follows: The instructor could call a mistake on a boy whenever he saw one, but a boy could not call one on another unless he had a witness. The reason for this was to eliminate unfair play. When a mistake was called on a boy, the instructor explained to the class just what the mistake was and how it should be corrected.

A prize, consisting of a 6-in. scale, was promised to the boy making the least number of mistakes in the week. The interest that was shown was surprising, and near the end of the week the competition was very keen. Where the average number of mistakes per boy on Monday was seven, it had been reduced to one on Friday.

This contest was well worth while, because the little careless mistakes have practically disappeared in our shop since we had that "No Mistake Week." It really proved quite an excellent plan to make the boys mistake-minded.

*Director Industrial Arts, Marcus Hook High School, Marcus Hook, Pennsylvania.

STANDARD OR AVERAGE TIME?

Laurence Parker*

THERE is or should be a standard or average time in which a piece of schoolwork should be completed. Industry uses a standard time basis for setting its piecework rates and other wage-payment systems.

Of course, there are some instructors who do make use of this idea. One, a drawing teacher, has devised the following, which in the form of a rubber stamp is used on the trim allowance of the drawing plates:

Name	Plate No. .....
Time Started	Date Started .....
Time Finished.....	Date Finished .....
Total Time.....	Average Time .....

The time required by any particular student can in this way be compared with the standard or average time.

Another teacher of electricity sets a standard time for every job. Then he rates the performance on the job as follows, using the scale of 1 to 4, with 1 as the best, on each of the factors, accuracy, application, neatness, and production.

He then averages the grades received on the factors, as shown in the following:

Accuracy	3
Application	2
Neatness	4
Production	3
	12
Average	3

Let us assume then, that the standard time for the job is 6 hours. If he does the work in 5 hours, his grade will be 5/6 of 3 or 2.5. Suppose he takes 7 hours. His grade would be 7/6 of 3 or 3.5. If his time was 12 hours or twice the standard, his grade becomes $12/6 \times 3 = 6$, that is, a failing grade as it should be.

A standard time of accomplishment is a great help to an instructor in rating student performance, and should be more often used in school shops.

*Kansas State Teachers College, Pittsburg, Kansas.

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

J. J. Metz, Editor

A HAPPY NEW YEAR

Many, many thousands of times has this wish been expressed by every kind of person in the past few days. Just what is implied by that wish? The word "happy" means a variety of things to different people. To some, it seems to be related especially to financial success; to others it may mean social preferment; to still others it may mean the successful culmination of a favorite undertaking. It is only to the few that happiness seems to have any relation to contentment.

This probably is due to the fact that contentment, which means to be satisfied, is viewed by many to be almost synonymous with stagnation, because they reason that one who is satisfied cannot be progressive, and must, of necessity, be on the downward path.

One of the definitions which Webster gives to the word "contentment," however, is *willing*. What immense opportunities, then, has the teacher to become happy. He need but be willing to give to the utmost that for which students come to his classrooms. Dispensing knowledge alone is but a cold task if the dispensing thereof is not tempered by human understanding and sympathy. This means that the teacher must be *willing* to do much that may not be down in his contract. It means that he must be *willing* to make extra efforts to get at the real boy beneath the mask that the average student presents as an exterior. It means that the teacher must be *willing* to make sacrifices for the sake of others.

Such *willingness*, of necessity, will spell contentment, because just as there is a physical law of action and reaction, so there is a law that the good done to another is reciprocal — that the happiness engendered in others brings happiness to him who is the cause of producing happiness.

The year 1931 then can be truly happy for everyone, no matter what circumstances may arise, if he be but willing to put the simple formula of the Golden Rule into active use. This places the teacher in an especially favored position, because he is in a position to render vicarious services to many, and hence his opportunity of garnering happiness by this means is limited only by his own desires to render such services to his students.

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THE APPEAL IN INDUSTRIAL WORK

Frequently the remark is made that the high-school students of today are not interested in the trades. It is said they want white-collar jobs and that they do not want to begin at the bottom and work their way upward.

If this is true, and there seems to be a great amount of evidence to substantiate this, the blame may be placed, at least to some extent, on the shoulders of the shop teachers who fail to fire the imagination of their students with the splendor of the accomplishments of the artisans of the past, and the stupendous achievement of the workers of today.

The wonderful pieces of statuary that have come down to us from the ancient Greeks impress us with their beauty, but our admiration for these statues does not minimize our approbation for the wonderful examples of architectural skill which the more humble Greek builders have left us. As a matter of fact, it may be safely said that the influence of the Greek builders is still exerting a very strong influence on the architecture of the present time. Can the student of today be brought to the realization that it is the work of the hands of the ancient artisan rather than of the sculptor that is of most benefit to us today?

The works of the philosophers, poets, writers, sculptors, and painters of the past are a rich inheritance which have come down to us. Their loss would be irreparable, yet the effacement of all traces of the simple mechanical devices which the ancient workmen had devised, would, no doubt, be much more disastrous to us. Imagine for a moment how far back our present civilization would be if the artisan of the past had left us no knowledge of the laws and of the uses of the lever, the pulley, the wheel, the wheel and axle, the inclined plane, the wedge, and the screw. Where would be our mechanical progress had the ancient artisan not given us the crude gear wheel, examples of which may still be seen in the water-raising devices and primitive machinery of India and elsewhere?

Just as a study of what we owe the past will help to awaken a feeling of respect in the heart of the industrial-arts student of today, for what the artisan of long ago has accomplished, just so will it be possible to fire his imagination by investigating the development which the old, crude mechanisms have undergone in order to become a part of the present-day mechanical marvels. We need only to have him examine the mechanism of the airplane, the automobile, the locomotive, the gigantic steamship, the intricate machinery of the printshop, the almost human action of automatic machinery, or the thousand-and-one devices, which make our lives so much easier than the lives of those who lived in the past, to have him realize the great advancement that has been made.

With proper guidance, it will not be so very difficult for the boy in the school shop to catch a glimpse of the influence which the workers who produced the wrought-iron commemorative column that was erected centuries ago near Dehli, India, and which has defied the elements since, has exerted on the development of the structural shapes used in the stupendous structures which are reared today.

When once the boy is brought to the point where he can vision the importance of the subject which he

is taking at school; when he can see the underlying artistry common to all manual work; when he can understand the absurdity of the baseless assumption that the industrial worker is of a lower grade than the office worker or the professional man; then it will be a much easier problem to recruit youthful workers for the trades.

THE BUSINESS SLUMP AND THE SCHOOL SHOP

Two merchants chanced to meet on the street.

"How is business?" asked one.

"Rotten!" said the other. "It is so rotten that even the customers who do not pay their bills refuse to give us orders!"

This little story pictures, in a way, the prevailing depression which at present afflicts the entire world. This depression, it may be stated, is a state of mind not entirely warranted, and it is to be hoped that a reversal is not far off.

But be that as it may, we want to point out here that the economic slumps which periodically afflict the country should not in any material degree affect the school. The reasons are obvious.

The schools must go on! The youth of the land must be trained in hard times as well as in prosperous times. The school shops must do the same kind of job today as they did two years ago. Their equipment must be kept up, materials must be at hand, and outside influences must not be allowed to interfere with the orderly procedure of the work.

Then, too, there may be some beneficial aspect in these adversities which may be turned to good account in the school. The students who are attending now have never had an occasion to live through a business depression. With their own eyes they can see at the present time how unfortunate those people are who have failed to train themselves for productive work. Just as soon as the depression began, unskilled labor, which could least afford to be without an income, was the first to feel the pinch.

It is true, the skilled mechanic, too, probably lost his job. Many of them did. But the skilled man can also do the work of the unskilled laborer, and because of his better training is usually given the preference.

What weightier argument could the shop teacher have to show his students the wisdom of preparing for something worth while in their youth?

Another point that should not be forgotten is that, during a period which spells unemployment for a great many, it is easier to sell the school shop to the community at large. In many communities the unemployed are invited to attend the school shop for a part of each day or during the evening, for supplemental training which will stand them in good stead when work again opens, or for training that will permit them to enter a better occupation than the one which they had.

The important thing, however, is that, depression or no depression, the efficacy and momentum of the schoolwork cannot be relaxed. The prestige, power, and prosperity of the nation must be upheld through its system of education. There can be no reduction of effort, no cutting down of time or costs. Our schools and, with them, the school shops must go on.

PROFESSIONAL ETHICS

There was a time in the earlier history of our country when it seemed to be taken for granted that orders for goods to be used in carrying on governmental functions could be obtained only by bribing public officials. With the development of a better understanding of the ethics and dignity of civic service, bribery was looked upon with more and more disfavor until now it has become an exceedingly serious offense to be guilty of either offering or accepting a bribe.

The information, therefore, that a manufacturer of materials for school use has offered a rebate to the teacher for selling his materials to the students, comes to us as a shocking piece of news. It is decidedly reassuring to the public that the teachers at once took a very firm stand against this method of approach. It was they who furnished the information which is the basis of this editorial, for they felt, and rightly so, that the offer was an affront to their official dignity and position.

The large majority of manufacturers and purveyors of school equipment and materials conduct their business on a high plane, and this exception to the rule therefore stands out the more glaringly. No doubt in most cases such offers would be immediately rejected by the teacher, but there may be individual cases where an inexperienced teacher unthinkingly might make the mistake of entering into such an agreement and thereby jeopardize his entire future.

The teachers and supervisors, therefore, who at once took steps to correct the manufacturer who made use of these dangerous methods of direct mail advertising ought to be highly commended. They show by their action that they view our school system in the right light; and their vigorous action bespeaks their determination not to allow the slightest germ of corruption an opportunity to destroy that which has been so painstakingly reared.

THE END OF THE SEMESTER

The following list may be found helpful in preparing for the new semester:

1. Make arrangements relative to unfinished projects.
2. Examine the equipment, preparatory to putting it in first-class shape, for the new semester.
3. Order the materials required for the new term.
4. Have tables and benches resurfaced before the new class enters.

Bird-House Building

*Leon H. Baxter**

(See Supplement No. 204)

OUR bird friends will soon be returning and we should have as many bird homes ready for them as we can.

Bird-house building is a yearly project in most schools and never loses its fascination for the boys.

Given a few proved rules relative to construction, and any boy may develop individually designed bird houses.

A gayly painted house with glaring colors is far from what we should strive for. Nature's own grayed colors, as near to the natural surroundings as we can get them, are what we should use.

Natural hollow-tree limbs are, of course, very nice, but artificial boxes may be so finished as to attract the birds equally well. One method of finishing is to tack cedar bark, either on the roof or all over the box. The tack heads soon rust and are not noticeable against the bark. Cedar is pliable and artistic, and affords enough roughness for the bird to obtain a foothold.

Stains, both green and brown, are good as they fade some in weathering and then harmonize with the leaves and tree trunks.

Do not use gloss paint as it catches and reflects light and scares away the birds. Gloss paints may be dulled by adding turpentine.

A very interesting finish may be obtained by painting the roof with thick green paint and the remainder with brown. Then take some sand, ordinary bank sand will do, and throw it all over the fresh paint. It will adhere to the paint and give a finish which is pleasing and artistic. Surplus sand which does not adhere to the paint, may be shaken off when the paint is dry.

Perches are not advisable in front of entrance holes as sparrows light upon them and annoy the birds that inhabit the house.

Means for cleaning out the houses at the season's end should be provided, also ventilation and drainage, as shown in the accompanying illustrations.

Place the bird houses in a quiet place, away from the direct rays of the sun and high enough to be out of the way of prowling cats and too inquisitive human beings.

Wren House

Figure 1 shows a little house for Jenny Wren, which is very neat and easy to make.

Two pieces C are first made by cutting pieces of ½-in. pine 6 in. wide and 7 in. long. Measure in 3½ in. on one long edge and draw lines to the two lower corners forming a triangle, as shown. Saw and plane to these lines, seeing that all edges are true and square.

In one piece, which is to be used for the front, bore a hole ⅞ in. in diameter with three smaller holes, 3/16 in. in diameter for ventilation holes, as shown in the illustration. One other small hole is bored for a 1-in. No. 6 r.h. screw in center of the lower edge,

*Western Reserve Academy, Hudson, Ohio.

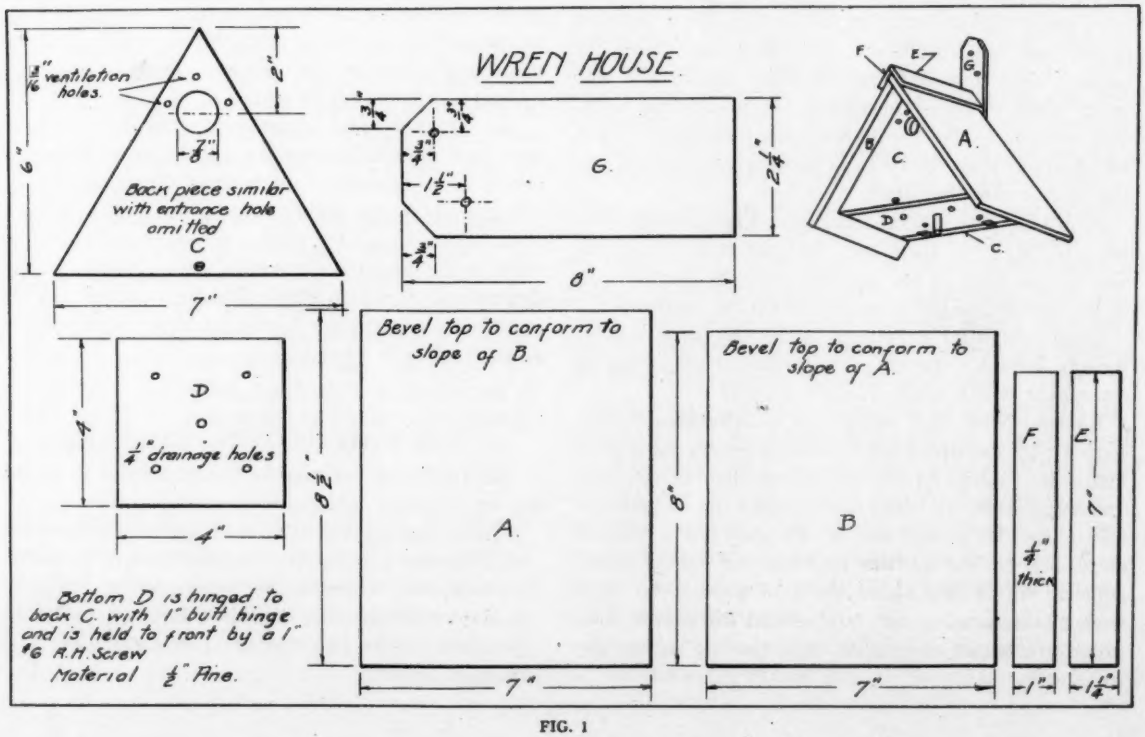


FIG. 1

about ¼ in. in from the edge. Later this allows the screw to be placed which holds the bottom of box (see Fig. 1). The bottom piece is ½ by 4 by 4 in. Bore five ¼-in. holes as indicated, four being for drainage holes and the center one to contain a short length of ¼-in. dowel, glued in, which is used to pull down the bottom for cleaning out the box.

Roof piece A is next made, ½ by 7 by 8½ in., and piece B, ½ by 7 by 8 in. In assembling, the longer piece A is nailed to piece B.

The back piece G is made of ½ by 2¼ by 8 in. with 3/16-in. holes bored where indicated for attaching to the back of the house with ⅞-in. No 6 f.h. screws and to the tree with common nails.

Pieces F and E, which are the saddle boards, are next made. Piece F is ¼ by 1 by 7 in., and piece E is ¼ by 1¼ by 7 in.

Sandpaper and assemble as follows:

Nail pieces A and B to back piece C, seeing that all edges are flush and using 1¼-in. No. 16 brads. Place front piece C 4 in. from the rear, allowing perfect fit for bottom piece D, and nail it in place similar to the back.

Secure bottom D with ¾-in. brass butt hinges as shown, first planing the edges to conform to the slope of the roof. Hold it in place with the screw previously mentioned.

Nail the thin saddle boards in place, using ½-in. No. 18 brads.

Attach back piece G to the box, using ⅞-in. No. 6 f.h. screws. This completes the box with the exception of the painting, which is explained in the introduction to the article.

Woodpecker House

Figure 2 shows a house which is hexagonal in shape. It is made in the following way:

The six sides A are first constructed, ½ by 4½ by 8 in., tapering to 3 in. wide at top. Each edge is then beveled at 60 deg., testing with a T bevel for accuracy. Considerable care must be taken to make these pieces uniform in shape and with an exact bevel to insure a tight workmanlike joint. In the side selected for the front bore an entrance hole 1½ in. in diameter and three small holes, 3/16 in. in diameter for ventilation holes.

Assemble these six sides by using small corrugated fasteners holding top and bottom edges of each piece.

Make piece B next. This is ½ by 10 by 10 in. Use the method shown at X, Figure 2, to lay out the hexagon. Cut it out.

Piece C is made in a similar manner, first cutting the piece ½ by 8 by 8 in. Piece D is first made ½ by 6 by 6 in. and piece E, ¾ by 3 by 3 in., and a small ⅛-in. chamfer may be put on its top edge.

Pieces G and F are made ½ by 4 by 4½ in., and a slot 2 in. long cut as shown, on one extending from top to center and the other from center to bottom edge. The shape may be made as shown or varied to suit individual tastes.

If a method for cleaning out the house is desired, a hole may be cut in piece C of a size that will insure piece D covering it when assembled. In this case piece D would be attached to C with ⅞-in. r.h. screws.

Nail C to top edges of A, first beveling edges of C to insure a flat, even fit. Use 1¼-in. No. 16 brads.

Attach B to bottom edges in similar manner. D and E are next attached and finally pieces G and F. These latter two should be secured to bottom of box with 1¼-in. No. 18 brads.

The back piece for attaching the box to the tree is now made ⅞ by 2 by 12 in. Bore 3/16-in. holes where indicated to attach to box and tree.

Secure this piece to the box with 1¼-in. No. 8 f.h. screws.

In attaching this box to a tree, place it against a limb which leans slightly outward. In this way the box will take a vertical position. Finish as suggested in introduction.

Bluebird House

Figure 3 shows a type of house which is always very popular, although it is of simple construction.

By studying the illustration and following the various steps as outlined in the preceding two descriptions, a very nice bluebird house may be constructed.

Dutch Colonial House

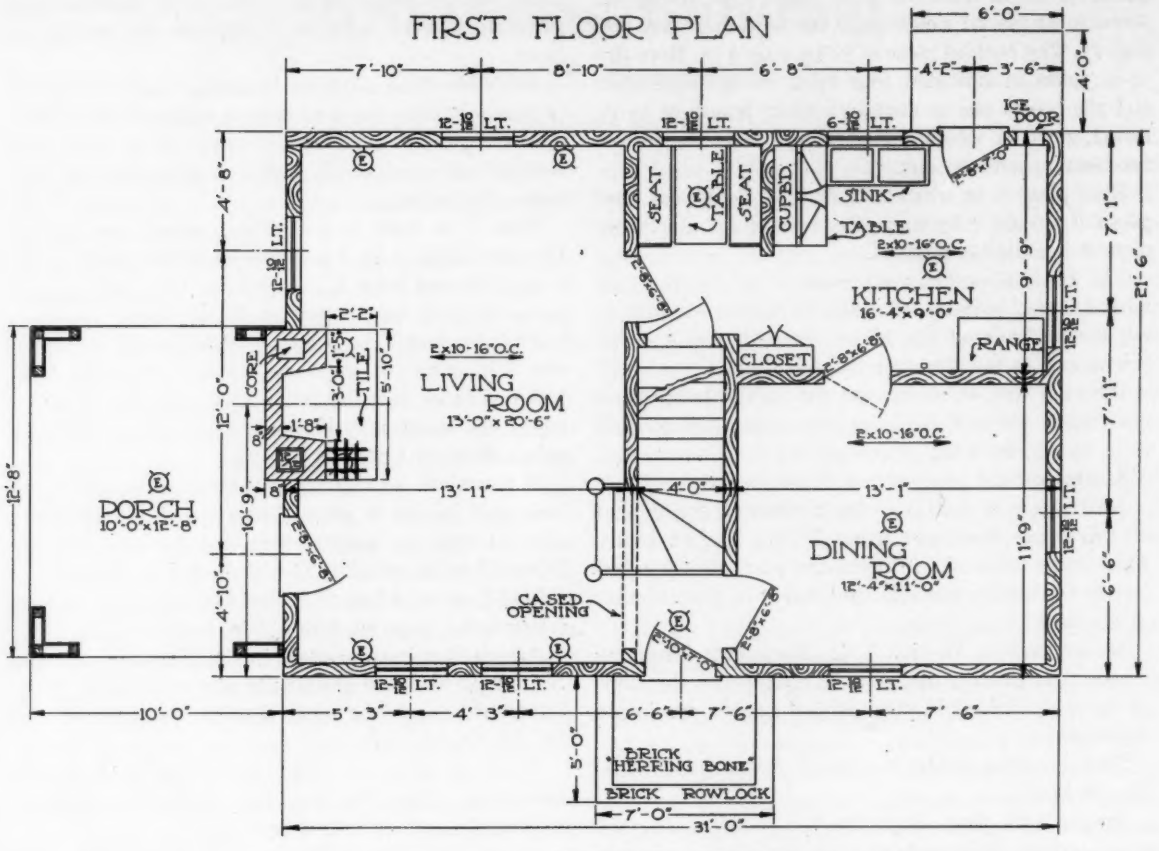
*J. E. Ray**

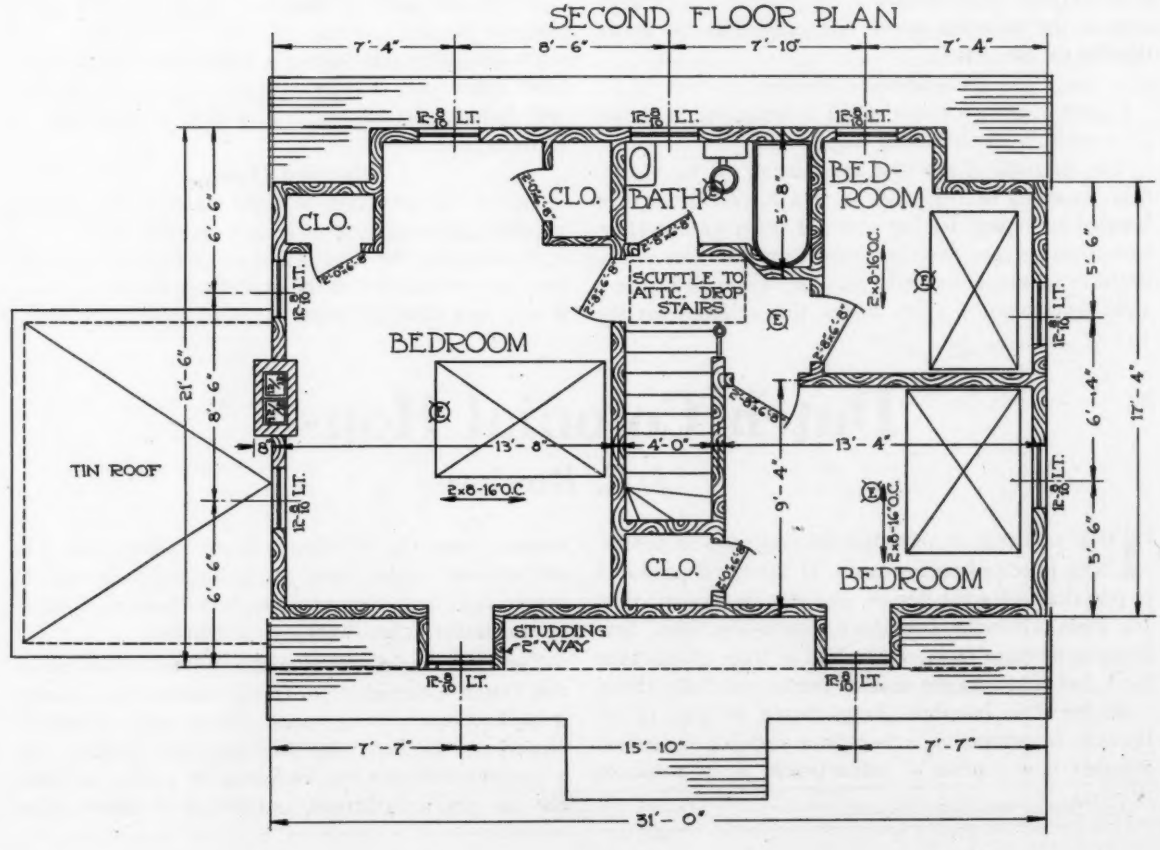
THE real test of an industrial-arts shop or laboratory is actual performance. If the work produced is practical, of good design, and has real merit, then the shop is functioning along progressive lines. Students appreciate seeing a product of their efforts take form and gradually shape itself into a real useful thing.

Where it is possible, shops should be able to coöperate in producing a complete product regardless whether it is a piece of cabinetwork, metal work, or even a house. In building a house, many classes in the various trades have an opportunity to put in "their bit" and also see the performance of other classes under actual working conditions.

The following description shows how a dwelling of the Dutch Colonial type, frame construction, having a medium-sized living room, dining room, breakfast alcove, and kitchen, with three bedrooms upstairs, one a master's bedroom, one bedroom for the boy and one for the girl, a bathroom, and plenty of closet space,

*Stout Institute, Menomonie, Wisconsin.


FIRST FLOOR PLAN
6'-0"
7'-10"
8'-10"
6'-8"
4'-2"
3'-6"
4'-0"
ICE DOOR
SEAT
TABLE
SEAT
CUPBD.
SINK
TABLE
2x10-16"O.C.
KITCHEN
16'-4"x9'-0"
RANGE
CLOSET
LIVING ROOM
13'-0"x20'-6"
PORCH
10'-0"x12'-8"
CORE
TILE
DINING ROOM
12'-4"x11'-0"
CASED OPENING
BRICK HERRING BONE
BRICK ROWLOCK
10'-0"
5'-3"
4'-3"
6'-6"
7'-6"
7'-6"
31'-0"


SECOND FLOOR PLAN
7'-4"
8'-6"
7'-10"
7'-4"
CLO.
CLO.
BATH
BED-ROOM
SCUTTLE TO ATTIC. DROP STAIRS
BEDROOM
TIN ROOF
CLO.
BEDROOM
STUDDING 2"WAY
7'-7"
15'-10"
7'-7"
31'-0"

was planned and completed by the writer's students.

The preliminary plans for the client's O.K. were drawn at ⅛ in. = 1 ft. After the approval had been obtained, the plans were then drawn at ¼ in. = 1 ft.

The work was started with the advanced class in architectural drafting. A series of lectures on style, etc., using *The Honest House,* "Southern Pine Series of Monographs," and *The Colonial House* by Aymar Embury II, as references.

The first-floor plan was then undertaken, the writer working right along with the students doing the same thing they were, and making notations of questions as they arose from time to time on the edge of drawing, so that they could be discussed the following day. This proved a very valuable device, and the students were advised to follow the same procedure in order to make the discussion periods as valuable as possible. The first floor was "roughed in" in 3 to 4 hours.

The next thing was to plan the second floor which made it necessary to draw the end elevation first, for the Dutch Colonial has a sloping ceiling in the second floor, small gable dormers in the front and a deck dormer in the rear. The floor levels were established, roof laid out correctly with a pleasing pitch, projection of cornice decided upon, windows located, and the dormers drawn in. This procedure was first demonstrated by the teacher, so that the student did not waste any time when he started to lay out the elevation on his own drawing. A time limit was set, and the second-floor plan was drawn in very much the same manner as the first-floor plan. Center lines were used for windows until all four elevations were drawn, in order to obtain a properly balanced appearance on the elevations. Windows were made a trifle smaller upstairs than on the first floor.

The front elevation was the next one to study and draw. After a lecture on proportion and balance, and a study of the first and second-floor plans, the floor levels, cornices, height, and roof lines were drawn in. Then the windows were placed and their relation to the interior and exterior view taken into consideration. The remaining elevations were finished by tracing the reversed outline of the two already finished.

The basement plan came next, and was drawn by tracing the first-floor plan and locating party walls, partitions, stairs, laundry, furnace rooms, coal rooms, etc. Piers were located for supporting the main girders, and the floor drains, and shut-offs indicated.

The transverse section was drawn next, giving roof layout, constructions, window and door heights, and stair layouts. This seemed to bother the students most. They were then ready to dimension the plans. After this had been done, they were required to detail the fireplace and the cornice.

After the plans were well under way, a demonstration was given on making perspective drawings, and each student was required to make such a drawing from his plans.

THE COMPLETED HOUSE

These perspectives were rendered either in crayon, in water colors, or in ink.

With the plans ready, the class was ready to begin the building of the house. As the carpentry shop at Stout Institute is large enough to permit the building of a house of this size within the shop, the work could be started at once. Under the guidance of Mr. Hansen, the carpentry instructor, two or three classes per day were put on the job. The work progressed nicely, and after 6 to 8 months the house was ready to be moved to the lot.

The sheet-metal work was done by the sheet-metal classes, the heating and plumbing put in, as also the electric wiring. The outside also was painted. No plastering was done at this time because the house had to be moved 8 or 9 blocks, to the lot which it was to occupy. The lathing was done, however.

The foundation was built of stone by a local mason. When this was finished, the house was placed on the foundation and squared up. The inside finishing was then started, fireplace built, and the front steps, landing, and some concrete work in the basement put in by the bricklaying classes.

The landscaping was planned by the architectural classes, and although landscape architecture was new they handled it nicely. Figure 3 shows the house as it appears now that it is finished.

The problem was an excellent one, and furnished good practical experience for all of the students who had the opportunity to work at it.

Junior-High-School Course Outline for Patternmaking and Molding

*G. H. Fern**

THE basic aims of industrial-arts courses are to contribute to general education and to offer such contacts and experiences as will enable a boy to "find" himself according to his capacity, ability, and aptitude. Basic industrial-arts courses should be chosen to offer the greatest guidance possibilities and to broaden the students general and technical knowledge. For some time such courses as woodwork, metal work, and others have been included in the junior-high-school curriculum. Boys working with metal had little conception of the relationship of metals with life activities in general; they also lacked knowledge as to the procurement of such castings as were used in their machine-shop course. An elementary course in patternmaking and molding will contribute a vast fund of interesting knowledge and experience to the junior-high-school boy. Such a course covers the following necessary aims, and once given will convince the teacher that the course is justified.

Aims to be accomplished are the development of:

1. A sense of responsibility
2. Initiative
3. A sense of reality of things
4. Ability to organize
5. Ability to analyze
6. Sense of size
7. Sense of shape
8. Sense of position
9. Sense of motion
10. Sense of quantity
11. Sense of accuracy
12. Consumers knowledge, appreciation and economic values
13. Career investigation
14. Recreational activity

After all, patternmaking and molding involve basic knowledges and skills significant in life. The course tends toward definite development of ability to think through situations and to plan a piece of work. A better understanding of other trades is also possible through this course.

Next to drawing, patternmaking and molding will do more to accomplish the foregoing aims than any other course. Then too, this combination course requires very little equipment. In fact, most of the equipment necessary can be made or obtained at a small cost.

The following is a brief outline, listing the work to be covered by groups and units. Each group and unit represents a type of work in logical and sequential order. The units as stated, also stand the test of standard trade practice. Jobs selected are arranged to fit each group and unit and should involve the principles stated. Each heading is expressed in terms of typical patternmaking knowledge with typical molding knowledge following. The course, as outlined, then becomes a combination course and can be given as such, or each given separately. In case patternmaking cannot be given, molding should be given so that molding jobs will be selected to meet the demands of the patternmaking headings. All patterns and molds are constructed according to types, but each type of job may have many variations and combinations. If the patterns are not made in the school shop, students can easily find models at home which can be fitted up quickly for pattern use and the mold made therefrom. Type metal, old lead, aluminum, and brass, may be used for casting purposes. The material used in castings will depend upon the equipment available in the way of a melting furnace. A small gas-fired melting furnace may be made at a small cost. This course makes an ideal basic unit in the general shop.

COURSE OUTLINE

Elementary Patternmaking and Green-Sand Molding

Group No. 1. Simple Patterns and Molds for Solid Castings

Unit A. Simple one-piece solid-block pattern for solid casting.

Unit A-1. Molding simple flat-back pattern for solid casting (pattern in drag only).

Type Jobs:

1. Paper weight.
2. Paper spindle base.

Unit B. Simple built-up pattern for solid casting.

Unit B-1. Molding simple pattern having irregular parting line.

Type Jobs:

1. Ornamental book end.
2. Toy motor base.
3. Medallions.

Group No. 2. Pattern and Mold Involving Green-Sand Cores

Unit A. Simple turned pattern, (turned on faceplate or chuck) involving the use of a green-sand core.

Unit A-1. Making a mold of pattern described in Unit A.

Type Jobs:

1. Metal pen-and-ink stand.
2. Small web pulley (holes in web).

Unit B. Simple built-up pattern (not turned) involving a green-sand core.

Unit B-1. Making a mold of pattern described in Unit B.

Type Jobs:

1. Electric toaster base (cast aluminum.)
2. Jewel box.

Group No. 3. Pattern and Mold Involving Dry-Sand Cores

Unit A. Simple pattern involving the use of a vertical dry-sand core.

Unit A-1. Making a mold requiring a vertical dry-sand core.

Type Jobs:

1. Small bushing (cored).
2. Electric heater base.

Group No. 4. Parted Patterns and Method of Molding

Unit A. Simple parted pattern for a solid casting.

Unit A-1. Molding a simple parted pattern (no cores).

Type Jobs:

1. Small bushing flanged both ends (not cored).

Unit B. Simple parted pattern involving the use of a horizontal dry-sand core.

Unit B-1. Making a mold of pattern described in Unit B.

Type Jobs:

1. Bushing flanged, both ends (cored).
2. Woodworkers' knife handle (cast aluminum, cored for hack-saw blade).

*Professor of Industrial Education. A. & M. College of Texas, College Station, Texas.

Dangerous Clothing

The boy in the above picture did not have his apron properly fastened at the waist.

This is always dangerous.

The picture shows how the loose ends may be caught by the belt or shafting.

If this occurs the wearer will most likely be hurt very badly.

Safety Series—Roy R. VanDuzee, West Allis, Wisconsin

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Putting Nails in Your Mouth is Very Dangerous

1. You may accidentally swallow them, especially when a cough or a sneeze comes on suddenly.
2. They may scratch the enamel of your teeth and cause tooth decay.

The Results of Swallowing Nails are always Serious

1. It lands you in the hospital.
2. It causes you pain and often makes a serious operation necessary.
3. It brings unnecessary grief and expense to your parents.

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Submitted by Jos. J. Lukowitz, Milwaukee, Wisconsin

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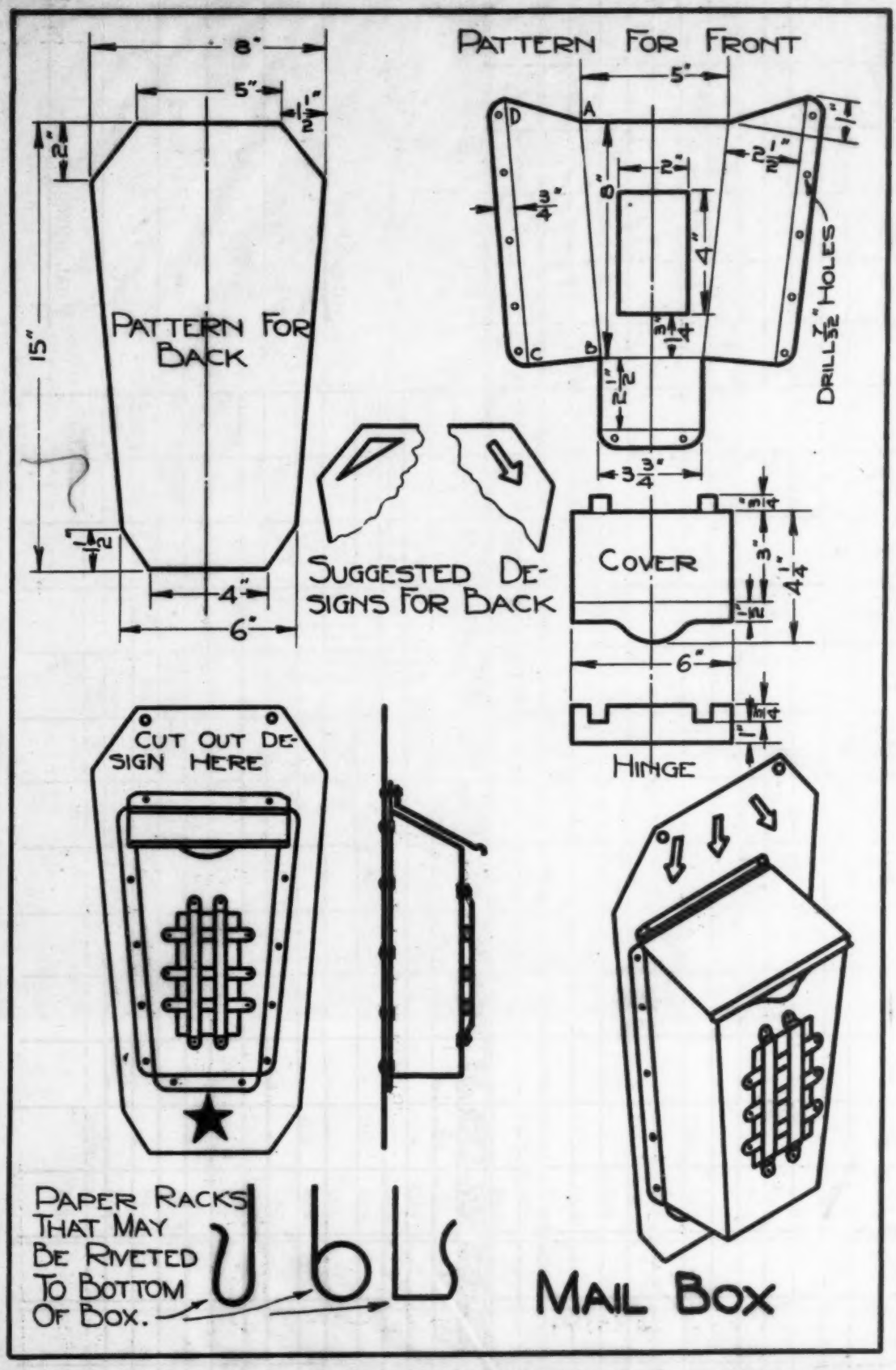

Designed by Conrad B. Bechtold, Cleveland, Ohio.

For Description See Page 65, Industrial Arts and Vocational Education, February, 1931

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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION
FEBRUARY, 1931

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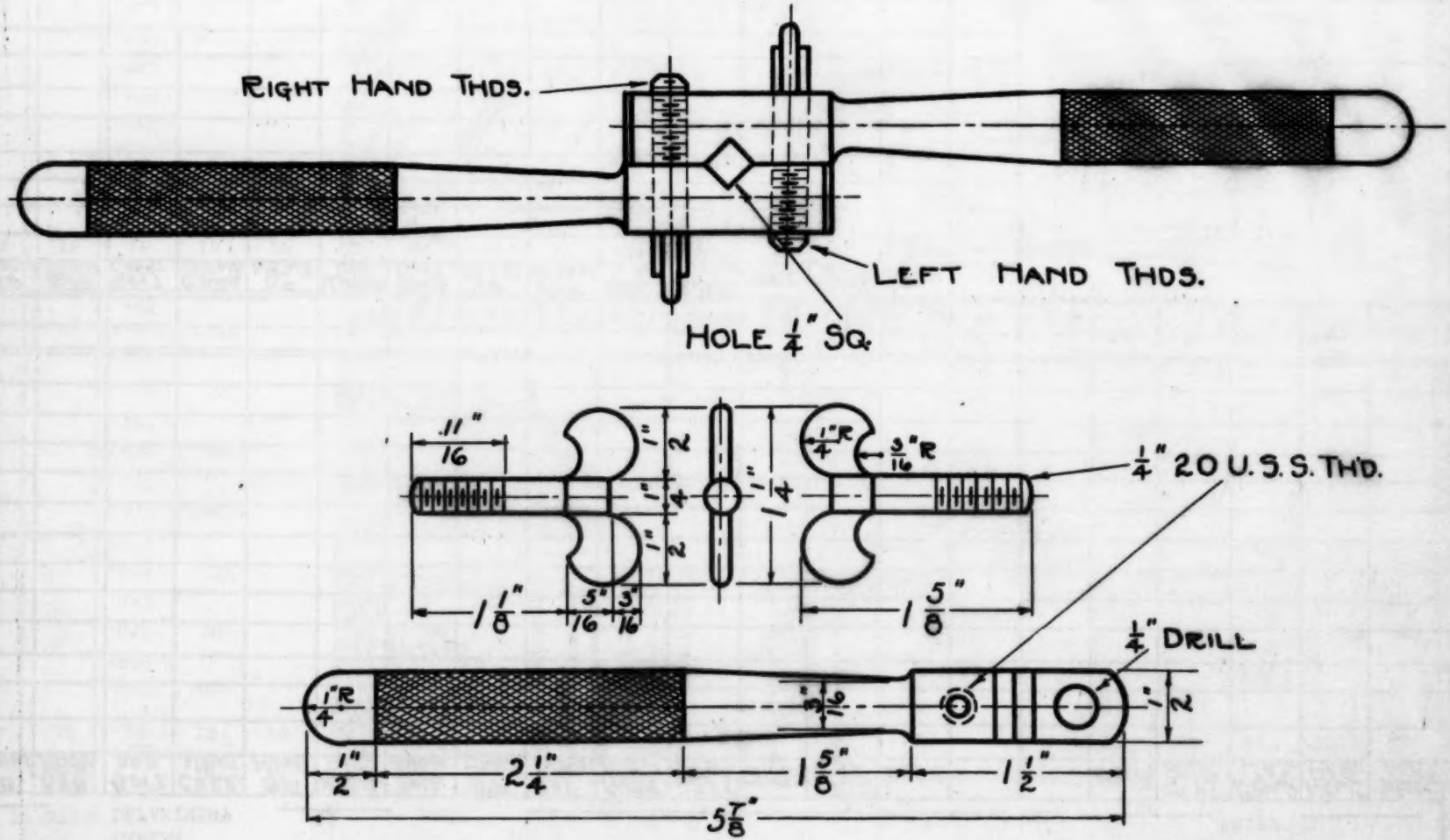
TAP WRENCH



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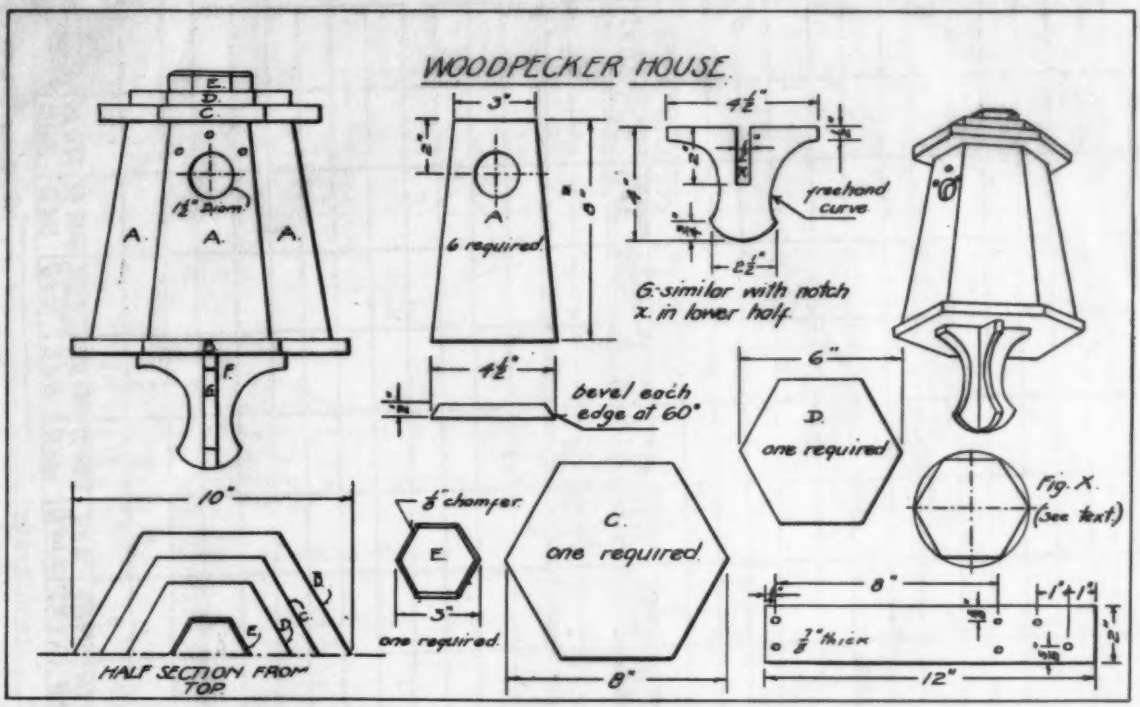

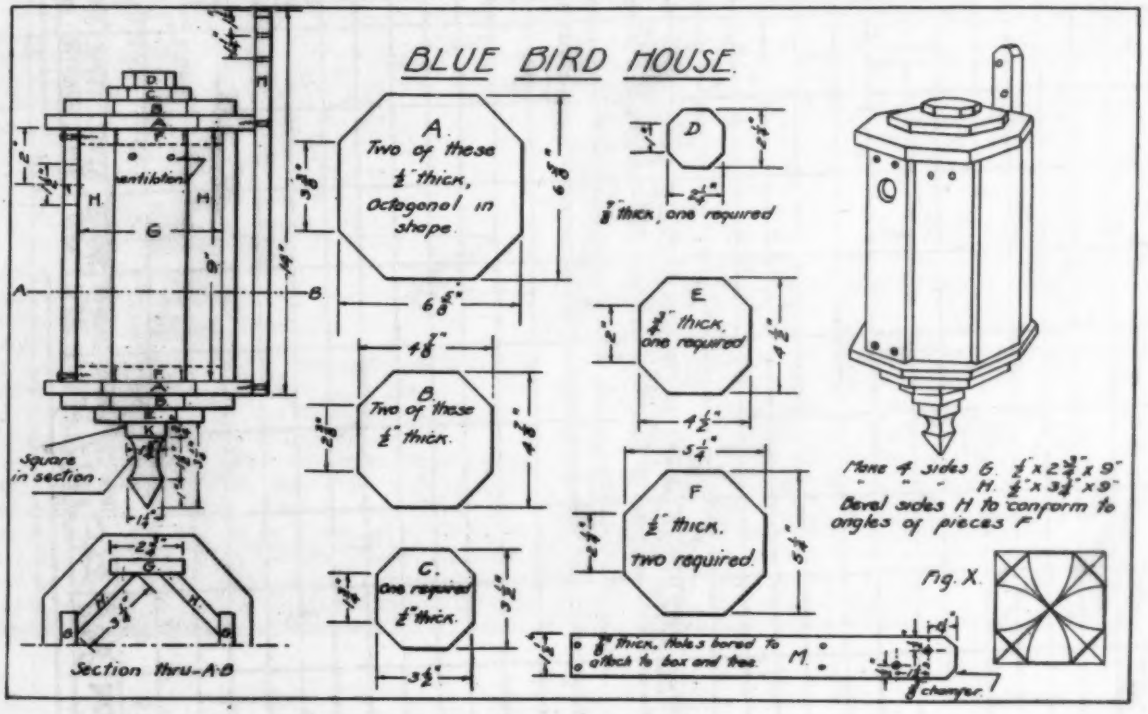

Top Fig. 2; Bottom Fig. 3

Designed by Leon H. Baxter, Hudson, Ohio.

For Description See Page 58, Industrial Arts and Vocational Education, February, 1931

For Description See Page 65, Industrial Arts and Vocational Education, February, 1931

Designed by C. I. Linthicum, Centralia, Illinois.

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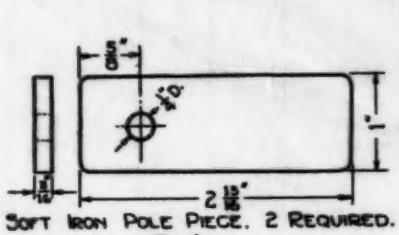


SOFT IRON POLE PIECE. 2 REQUIRED.
FIG. 1

SOFT IRON CORE 1 REQ.
FIG. 2

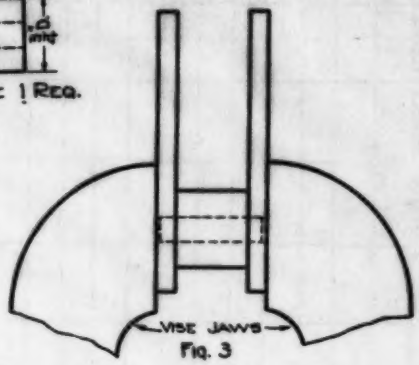


FIG. 3

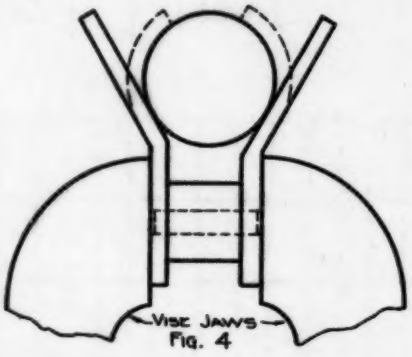
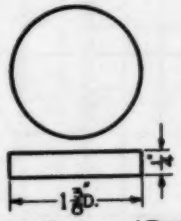
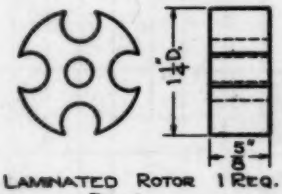


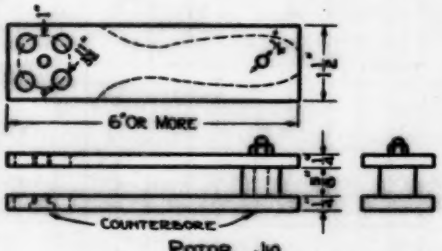
FIG. 4



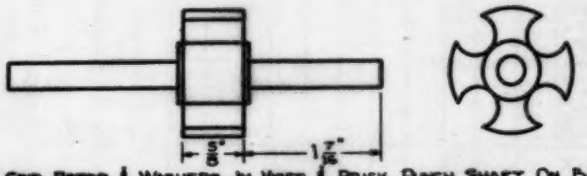
WOOD SPACER. 1 REQ.
FIG. 5



LAMINATED ROTOR 1 REQ.
FIG. 6



ROTOR JIG
FIG. 7



GRIP ROTOR IN WASHERS IN VISES & PRICK PUNCH SHAFT ON BOTH SIDES.
FIG. 8

COMMUTATOR. 1 REQUIRED
FIG. 9

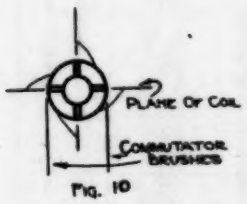
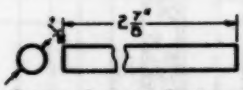
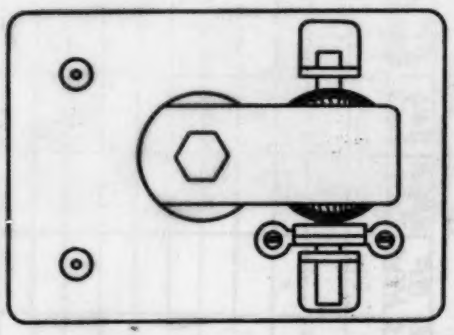


FIG. 10

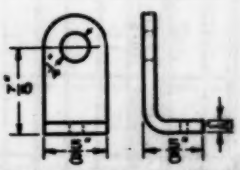
ATTACH BRASS TO FIBRE WASHER BY INSERTING TWO RIVETS TO EACH QUADRANT.
FIG. 11



ROTOR ARBOR. BESSEMER ROD. 1 REQ.
FIG. 12



COMMUTATOR BRUSH. SPRING BRASS 2 REQUIRED.
FIG. 13



ROTOR BEARING. BRASS OR IRON. 2 REQUIRED
FIG. 14

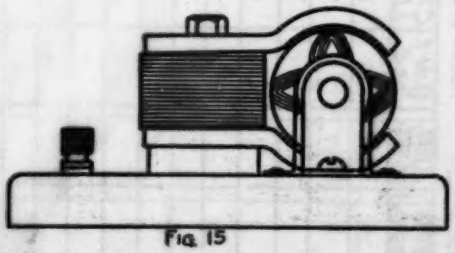


FIG. 15

Toy Motor, Designed by A. D. Keller, West Los Angeles, Calif.

For Description See Page 66, Industrial Arts and Vocational Education, February, 1931

PROBLEMS AND PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts and Vocational Education. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in woodworking, turning, patternmaking, machine-shop practice, sheet-metal work, forging, foundry work, auto mechanics, auto electricity, electricity, architectural and mechanical drafting, printing, bookbinding, concrete work, farm mechanics, home mechanics, and other lines of industrial-arts work are desired for consideration.

A METAL MAIL BOX

Conrad B. Bechtold, Cleveland, Ohio

(See Supplement No. 202)

An Instruction Sheet

Objectives

1. To make a sheet-metal mail box.
2. To study the brake, and to learn how to use it properly.
3. To become familiar with different thicknesses of metals, and their uses in construction work.
4. To become familiar with the use of the square in laying out work.

Introductory Information

This type of mail box, while particularly adapted to a colonial house, makes a most attractive substantial box wherever used.

The principles of design followed out in this box should conform to the design of the building where it is to be used. Notice how the rivets, while serving to fasten various parts of the box together, also serve as part of the design and add to the general appearance of the mail box.

Practical Work

1. *Job Specifications:* The box is to be made of 18-gauge black iron. For dimensions and details of construction see the illustration.

Materials

1 piece 18-guage iron 8 by 15 in.
1 piece 18-guage iron 12 by 13 in.
1 piece 18-guage iron 6 by 5 in.
3/16 in. round-head black rivets
1/8 in. round-head black rivets

Tools and Equipment

Square; snips; brake; drill; rule; hammer; punch; cold chisel; rivet sets; squaring shear.

Procedure

1. Lay out the pattern for the back, taking the dimensions from the sketch and working from a center line.
2. Cut the pattern for the back on the squaring shears.
3. Lay out the pattern for the front of the box.

Draw a center line first; then lay out the pattern of the center section, starting at the bottom. Be careful in laying out the wings of the pattern. Notice that the top and bottom lines are at an angle. This angle is obtained by placing one blade of the square on the lines representing the sides of the center section, as A to B, and by drawing lines at right angles to each extremity, as AD and BC. *"Have this O.K'd by the instructor before cutting."*

NOTE. Whenever you are laying out articles of this nature with sloping sides, the corners of which are to be at right angles, remember that the adjacent sides are laid out at right angles.

4. Cut out the hole in the front with a sharp cold chisel on an iron block.
5. Space the rivet holes carefully and either drill them or punch on the lever punch. Have five holes on each side and two in the bottom.
6. Form up the front on the cornice brake as far as possible and finish on a square stake, using a mallet. Make the first bend of the bottom section over the edge of the square stake. All others can be made on the brake.

NOTE. Think through the various operations on the brake to make sure that the proper bends are made first so as to allow most of the forming to be done on the brake. Check with the instructor *before* making any of the bends.

7. Cut the strips 3/8 in. wide for bars across the opening. Punch holes, form the bars, and rivet them in position across the opening.
8. Cut out the design in the back, with chisels. Finish with a file.
9. Rivet the front to the back, having the heads of the rivets toward the front.
10. Cut and form the cover and the hinge. Put the groove in the cover with the beading machine. Form the lip with a mallet over a round stake.
11. Put the cover and the hinge in place, mark the holes, drill them and rivet the cover in place.
12. If desired, band iron may be formed up and riveted to the bottom of the box to hold papers and other mailing matter.
13. To preserve the box and to prevent rusting, it should be given an antique finish with paint, or, if a natural iron finish is desired, a coat of clear lacquer could be applied.

NOTE. If equipment is available, the design, and opening on the front of the box may be sawed; or it may be cut with a slitting shear. Some of the boys in the writer's classes have made very attractive boxes of 32-oz. sheet copper with the entire surface hand-hammered and in some cases have substituted for the barred opening a grill formed by cutting out a monogram. This has proved to be a very practical project and one about which boys are enthusiastic, since they have no trouble finding a market for this article if they care to sell it.

TAP WRENCH

C. I. Linthicum, Mechanical-Drawing Instructor, Centralia, Illinois

(See Supplement No. 203)

The tap wrench is a project that can very easily meet the needs of three different shops: the machine shop, forging department, and machine drawing and design classroom. A careful scrutiny of the problem will show its latent possibilities, and the model shown may be changed to suit the particular shop in which the instructor wants to use it.

As a machine-shop problem the project embodies cylindrical turning, thread cutting, knurling, taper turning, milling, chipping, filing, drilling, tapping, hardening, and polishing.

This tap wrench was designed primarily as a forging problem. The elaboration came about when the simple lines of the forging problem were elaborated and improved in the drawing room so that it became a job for the machine shop. The related information to go with this problem might include thread cutting, set screws, taper turning, or any other topic not taken up to this time.

CONSTRUCTION OF TOY MOTOR

A. D. Keller, University of California, West Los Angeles, California

(See Supplement No. 205)

The project described herewith is a sturdy little motor. It is very simple in construction, but it shows the fundamental principles that exist in motor construction.

Cut two pieces of soft iron, 3/16 by 1 by 2 13/16 in., for the pole pieces. File the ends smooth, round off the corners, and bore a hole as indicated in Figure 1.

Next, saw off a piece of soft iron, ¾ in. in diameter and ¾ in. long, for the core. Square the ends and bore a ¼-in. hole through its center as shown in Figure 2.

Then cut a piece of ¼-in. Bessemer rod 1 1/16 in. long. Assemble the two pole pieces and core on this rod and clamp in the vise as shown in Figure 3. Bend the ends outward as indicated in Figure 4 and form them as shown by the dotted lines. Make a wood spacer as shown in Figure 5.

Then assemble the pole pieces, core, and spacer on a suitable base about ½ by 3¼ by 4½ in., using a ¼-in. bolt about 1¾ in. long, as is shown in Figure 15.

To make the laminated rotor, Figure 6, clamp the laminations into the jig shown in Figure 7. The laminations should be 1⅜ in. square, each with a ¼-in. hole through the center.

After boring the holes for receiving the wire coils, remove the laminations from the jig, and insert them between two heavy washers holding everything together with a cap screw and nut. Then saw the projecting corners off the laminations, and grip the head of the cap screw with a three-jaw chuck on the lathe, and turn the rotor down to 1¼-in. diameter. If a lathe is not available, after boring the laminations cut each one roughly to diameter with shears. Assemble them between heavy washers and file or grind them down to a true diameter. Before winding the coils on the rotor, insulate the slots with fish paper or any tough rag paper. Assemble as shown in Figure 8, using a prickpunch to score the shaft to hold the rotor and washers in place.

Then solder the washers to the arbor. The commutator is made by riveting a heavy brass washer to a fiber washer and then cutting this brass washer into four parts, as shown in Figure 9.

Solder the four ends of the two coils to opposite commutator segments. Locate the commutator with respect to the coils, as shown in Figure 10.

Add a second fiber washer, as shown in Figure 11, to make a more rigid commutator.

Figures 12, 13, and 14 show how to construct the rotor shaft, commutator brushes, and rotor bearings respectively.

Attach the commutator to the shaft by shellacking both shaft and the hole in the fiber washers. Then assemble and allow the shellac to dry thoroughly. In assembling the motor the bearing may be adjusted to the proper height by using paper shims, or a wood spacer under the rotor bearing. Use No. 22 single-covered wire for winding both rotor and field. This motor, when finished operates on 6, 12, or 20 volts.

WALKING CAMEL

W. I. Tawes, Morgantown, West Virginia

The walking camel described in this article embodies an ingenious mechanism to produce the walking effect. This clever and simple project will appeal to the average boy of junior-high-school age who likes to see things *move*. Any quadruped of the larger species, besides the camel, can be used. The giraffe also is very effective.

Instruction Sheet

Tools Necessary

Coping saw; soldering device; side-cutting pliers; hand drill with bits; screw driver.

Materials Necessary

One square foot of ⅜-in. 3-ply stock; ⅛-in. tinned steel wire, 36 in. long; scrap sheet metal for lugs and bearings; 16 ⅛-in. tinned washers; 2 pieces ⅝ by ⅝-in. iron; 4 small round-head screws; 4 stove bolts, 3/16 by 1¼ in.; solder and flux.

Operations

Camel. Lay out the shape of the camel on a piece of ⅜-in. 3-ply stock, as shown in the drawing. Lay out the legs separately. Both front legs and both hind legs are alike. Bore a small hole at each end of each leg for the joint pin. The hole should be large enough to allow the legs to hang freely. The holes in the hoofs should be small so that the pins will fit tightly. Bore small holes for the upright supports. They should fit tightly. A piece of cord, knotted or whipped ¾ in. from the end, will make a dandy tail. Comb out the twist beyond the knot. The tail should be glued fast in a hole drilled for this purpose. Assemble the legs. They are held in place with a washer soldered on each end of a copper pin. Be sure the legs fit loosely.

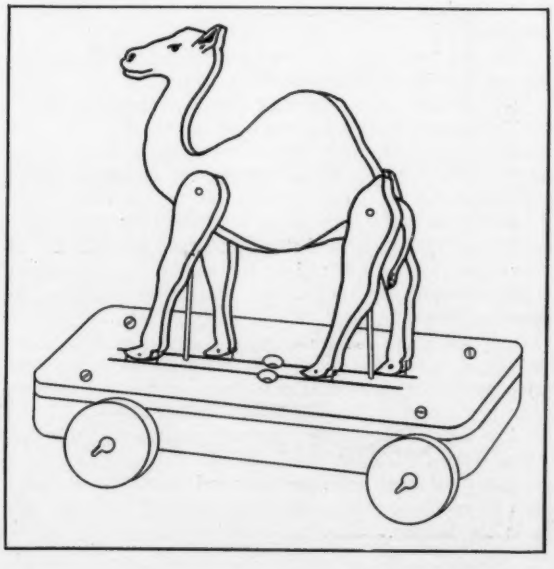
Platform. Lay out the platform as per directions in the illustrations. The two large holes are bored so that the saw may be started easily to cut the tracks or slits for the lugs to move in. These lugs move the camel's legs. The perspective drawing shows the track cut with the lugs in place. Lay out the sides and nail them in place.

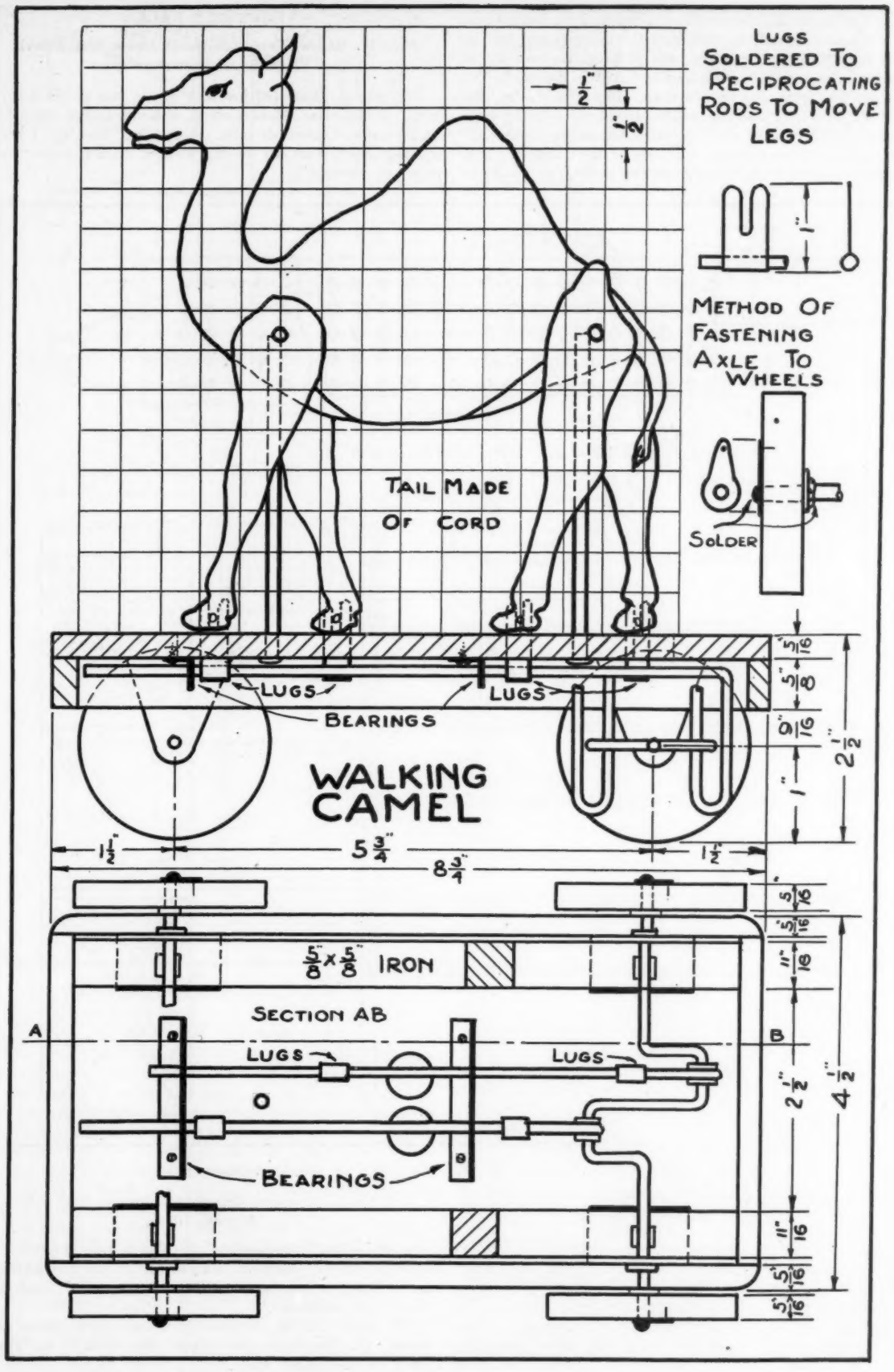
Chassis. This is the most difficult operation. Cut two pieces of iron (square) ⅝ by ⅝ in. Cut the axle bearings out of 20-gauge sheet metal, and bend it around the square iron. Fasten the bearings in place with solder. Be sure to locate their positions exactly. Drill a 3/16-in. hole 1⅛ in. from each end of iron bars. This hole will go through the bearing plate also. The hole is at right angles to the hole for the axle in the bearings.

Cut two pieces of wire for front and rear axles. The cranks in the rear axle are only ⅝ in. off center. If larger play is desired the wheels must be increased in size. The crankshaft must be bent so that the camshaft will be in line with the lug tracks in the platform. Solder two washers on the camshaft to hold the reciprocating rods in line. Put the axles in place and solder a washer on each end, near the bearing, allowing a little space for play. Bend the reciprocating rods as shown. Be sure to bend them long enough so that they will not jam when the camshaft turns vertically. Make the bearings which hold the reciprocating rods in place.

Cut out the wheels 2 in. or more in diameter and fasten them upon the axles as shown. Cut the lugs out of scrap sheet metal.

Assembly. Fasten the upright rods which support the camel to the platform. Bore holes in the platform to coincide with the 3/16-in. holes in the iron bars. Place the platform




LUGS SOLDERED TO RECIPROCATING RODS TO MOVE LEGS
METHOD OF FASTENING AXLE TO WHEELS
SOLDER
TAIL MADE OF CORD
LUGS
LUGS
BEARINGS
WALKING CAMEL
5 3/4"
8 3/4"
5/8" x 5/8" IRON
SECTION AB
A
B
LUGS
LUGS
BEARINGS

upon the chassis and fasten it in place with stove bolts. Place the reciprocating rods in place with the bearings and lugs in their respective positions. After the reciprocating rods are in place on the camshafts, the bearings may be fastened. The lugs are left loose and free to move. The apparatus at this time can be tested. The mechanism should move freely. Correct all errors if there are any before proceeding further. If there are no errors turn the rear axle so the cranks are in a vertical position. Hold the legs of the camel (all of them) also in a vertical position. With the cranks and legs in this position, fasten the lugs in their proper places on the reciprocating rod. The lugpins can now be forced into the hoofs, fastening the camel to the mechanism.

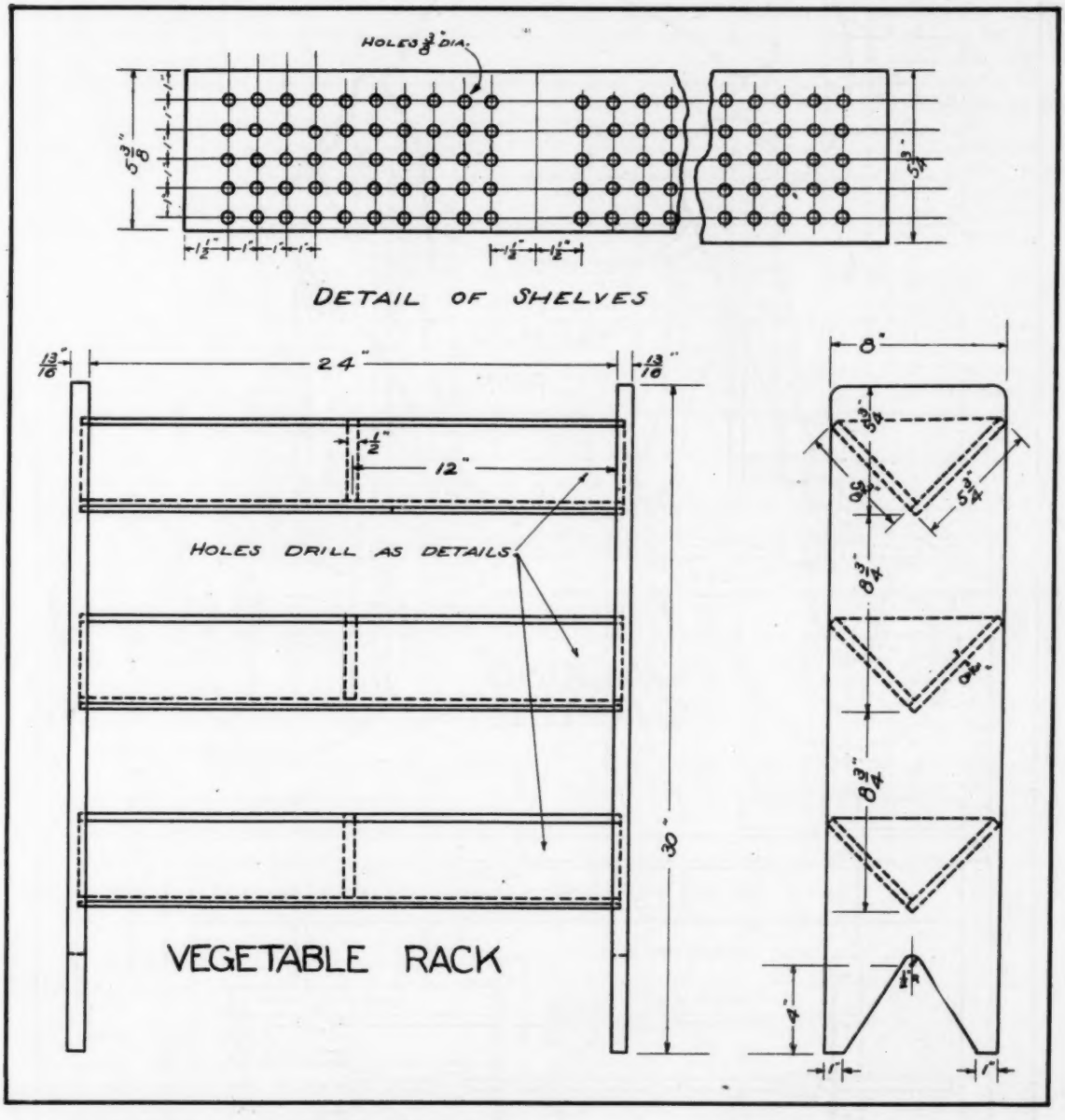
Finish. Paint the camel in appropriate colors and allow to dry thoroughly before using.

NOTE. The square iron bars can be eliminated if the platform is made of heavy wood and grooves cut for the reciprocating rods. The wheels also must be larger in diameter to increase the leverage. It takes considerable power to operate this mechanism, therefore weight and leverage are very important.

VEGETABLE RACK

Fred W. Megow, Thomas Williams Junior High School, Philadelphia, Pennsylvania

The project illustrated herewith makes one which is very useful in the home. Most mothers welcome such a vegetable rack because it helps her solve the problem "How can I keep my vegetables from day to day without making the kitchen or pantry untidy?"

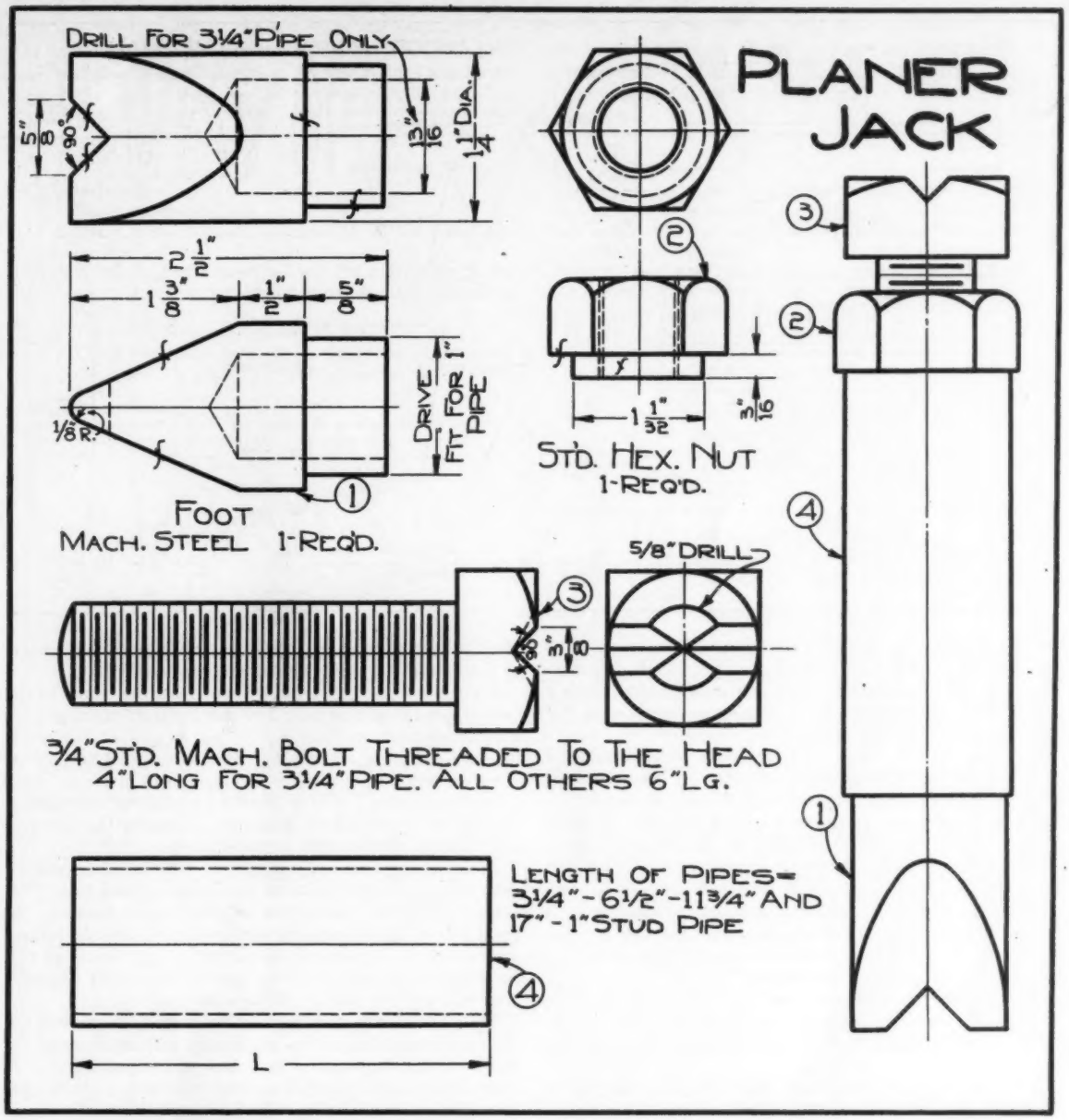


PLANER JACKS

J. T. Hayes, Vocational Department, Bucyrus High School, Bucyrus, Ohio

In planer work the problem of set-up is usually more difficult than on any other machine, and it is here the mechanic has a chance to exercise his ingenuity by using his "furniture" to the best advantage.

The jacks, or kicks, shown in the drawing have proved very useful. The four sizes give lengths from 6 to 25 in. These jacks are very easily made.



ALL-WOOD MODERN PLANT STAND

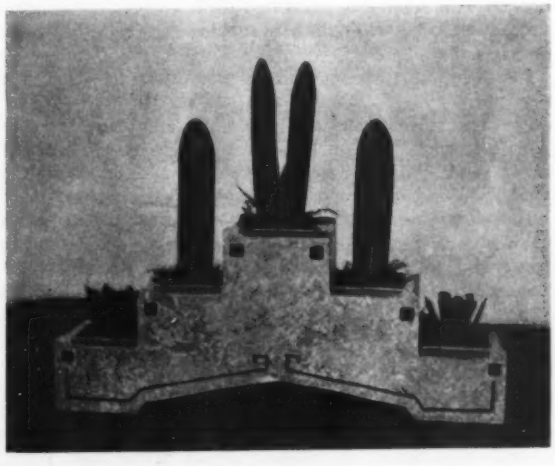
George Dally, Boys' Technical High School, Milwaukee, Wisconsin

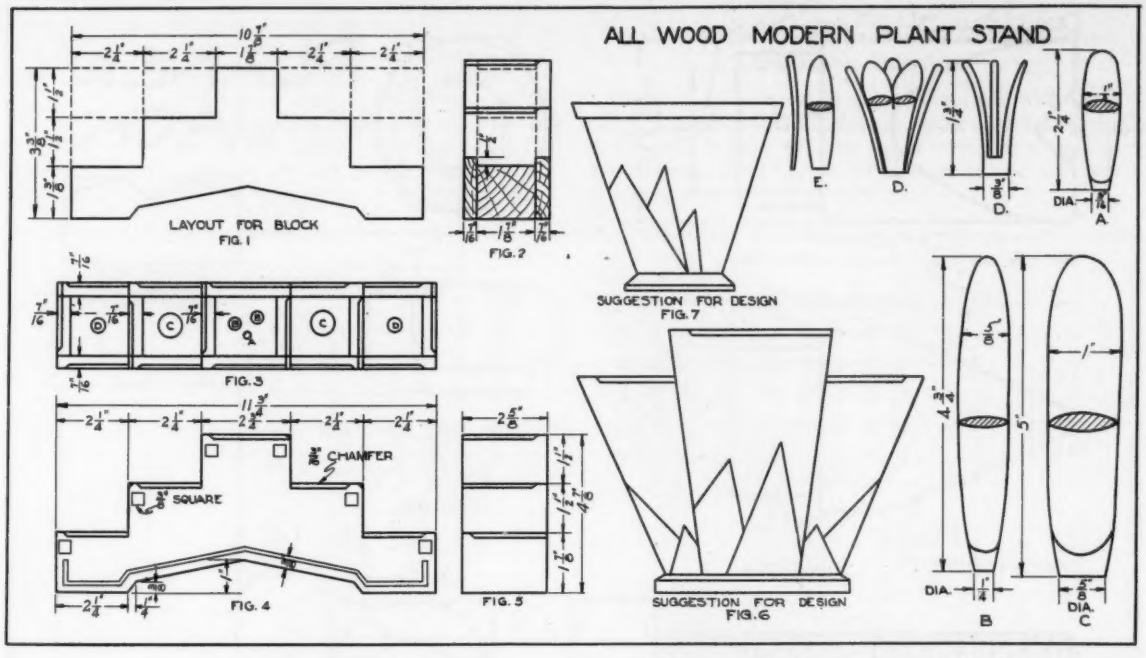
The small plant stand described herewith affords many possibilities of development. Boys exhibit a great deal of enthusiasm when given an opportunity to work out problems of this nature, and many variations of the design shown in the illustrations should be aimed at.

The core of the stand is made of a solid block of 2-in. pine, planed to proper thickness, after which the spaces are marked off as shown in Figure 1. Then the surplus stock is cut away accurately with a saw.

End pieces are then cut and fastened in place with glue and small brads, and finally made to fit flush with the surfaces of the core by touching up the end grain with a smooth plane.

The front and back of the stand may be conveniently made by tracing the assembled core and ends on the surface of one of these pieces and cutting out both at one time by holding them together temporarily with two brads. The two may





then be placed in the vise while sawing out the steps. They are fastened permanently in place, as shown in the illustration. The end grain of the front and back is pared with a chisel where irregularities occur, as are the chamfers on the top edges of the several steps.

Holes for receiving the plants are bored after plants have been whittled out of small pieces of soft pine. These may be made of wood found in the scrap box. The side leaves of the two end plants were whittled to shape separately, and glued to the sides of these two plants, after the knifework and sanding had been completed. Refer to Figures A, B, C, D and E for further details of plants and their parts.

Plant life depicted in this unique stand is from the cacti group, because such use adds to the sturdiness and the dignity of the total effect, and because the choice is in keeping with the modern lines of the stand.

If this project is used as a special *fill in* or *holiday problem* in a high school, biology students may be given the opportunity of looking for other plants, which may be suitable for this purpose.

This modern plant stand was finished by first applying an undercoat of light-cream paint. After the undercoat dried, a light-green quick-drying enamel was applied, which was then tiffanied with a piece of crumbled paper to give it a marble effect. The enamel was dulled by rubbing slightly with pumice stone and oil.

The chamfers stand out nicely when they are painted a deep green.

The small squares and the lines which emphasize the contour were painted orange. These designs were drawn on transparent paper and transfered on both front and back of the stand. This method produces evenness of squares and lines.

The plants were painted last, with a natural cactus green and then made to appear more realistic by adding a few light-green stripes to the leaves. They were glued in place.

Sand with a few pebbles added, sea ferns, or artificial plants with fine leaves, may be used at the base of the plants if desired.

THE PRINTSHOP CLUB

Adolph L. Juten, Duluth, Minnesota

In order to encourage the spirit of coöperation among the students who attend the printing classes of the East Junior High School, a printshop club made up of all the members of the different printing classes was organized.

The name for the club was selected from the names of the tools which the printer uses. The club holds its meetings once a month. Outside speakers were invited to give talks on printing subjects and the members themselves discuss or give reports on topics of interest to the student of printing. Sometimes the meeting period is devoted to a tour of a newspaper plant or to a commercial printshop. Invitations for tours of this kind are gladly given to the students.

In order to give a real objective to the club, the members were given the opportunity of operating a school store. This store is opened for business for 15 minutes each morning. The usual line of school supplies is kept in stock and the articles are sold to the students of the school at retail prices so that no charges of unfairness can be made by merchants who have their stores in the vicinity of the school.

The profits from this business have made it possible for the school printshop to buy ornaments, cuts, and special display type that help greatly to enliven and broaden the work taken up in class. The club also has been able to help other school projects in a financial way through the profits earned at this store.

The greatest benefit that this venture has brought about is the feeling of friendly coöperation and responsibility that it has engendered. Two boys are assigned to take charge of the store each morning. They lay out the supplies on a table at one end of the printshop, and at closing time they pack up the goods and put them away. If one of the boys who has been assigned to this task cannot appear on his morning, it is his duty to call some other boy to take his place, for the school must be served.

The organization of this club and the work which it undertakes requires some preliminary planning by the instructor, but after the work has been once started, he need be but an onlooker. The boys themselves become very enthusiastic, and the instructor will usually find that his greatest difficulty is to see that the students get as many turns at each job as they desire.

PEWTER NAPKIN RINGS

E. W. Manzer, Bronxville, New York

Pewter as a metal for the school shop is rapidly gaining ground. There are many things in favor of its popularity.

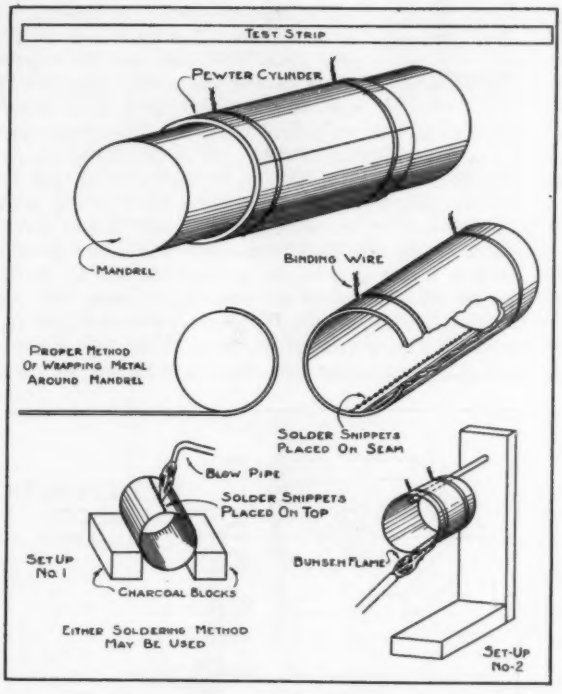
In the first place, it can be easily worked and does not have to be annealed. It is inexpensive, easily soldered with soft solder, and when a piece of work is finished it finds a welcome place in the home. Many pewter articles may be made in the school shop with very little extra equipment, in fact, most of the equipment of any general shop is quite sufficient to start work in pewter.

The napkin ring described herewith is a very interesting

Instruction Sheet for Napkin-Ring Project

Procedure

1. Select mandrel for ring.
2. Cut a strip of 16-gauge pewter ¼ in. wide, and 7½ in. long.
3. Wrap the strip around the mandrel and cut it to the exact circumference of the mandrel. Get instructor's O.K.
4. Unroll the strip and measure its length.
5. Check this length with the circumference of the mandrel which is found by multiplying its diameter by 3.1416.



6. Cut a piece of 16-gauge pewter 3½ in. by the length of the strip you have cut. This will be a rectangular piece. Clean both sides of the piece with old emery cloth. This removes all surface scratches. Get an O.K.
7. Wrap this piece around the mandrel and smooth the outside with steel wool. Make the joint fit closely. Get an O.K.
8. Clean the joint with steel wool, then wind binding wire around each end of the pewter cylinder and fasten it tightly.
9. Remove the cylinder from the mandrel.
10. Cut small snippets of 50-50 solder, flux the joint,[1] and place solder on the joint inside of the cylinder.
11. Hang the cylinder on a small dowel rod, with the seam and solder down, as shown. Get an O.K.
12. Light the Bunsen burner, and adjust it to a 1½-in. flame. Get an O.K.
13. Play the flame on the bottom of the cylinder. Do not let it heat one spot too much or the pewter will melt. Keep the flame moving.
14. When the flux boils, the solder will soon melt. Remove the flame as the solder melts and reheat it by moving the flame under the cylinder intermittently. This is done to keep the heat up to the melting point of the solder. When all solder has melted take the flame off or the pewter will melt.
15. Cool and wash the cylinder to remove the flux which contains acid. Get an O.K.
16. Remove the wire and place the cylinder on the mandrel.
17. File off surplus solder from seam, using a draw-filing stroke. Get an O.K.
18. Place the mandrel on the lathe and clean the outside of the cylinder with old emery cloth and steel wool. Run the lathe at high speed. The cylinder also may be cleaned, by placing it between the vise jaws, end for end, using emery cloth and steel wool. Get an O.K.
19. Cut cylinder in two parts, thus making two rings. The cutting may be done on the lathe with a cut-off tool, or it may be done with a jeweler's saw, holding the cylinder in a vise.
20. Enrich the ends or surface by filing or knurling.
21. Finish the ends with steel wool and clean the inside. Get an O.K.
22. Weigh the rings and charge the material on the material card.
23. Evaluate your work. How would you improve this project if you were to make it again?
24. Have a member of the class criticize your work.
25. Submit the project to instructor for grade.

[1]Pewter flux is made by mixing 10 drops of hydrochloric acid in 1 ounce of glycerine.

Reference for Required Reading

Technical Information

Pewter Design and Construction, Varnum, Chapter II, "Alloys of Pewter and Processes."

Related Information

Pewter Design and Construction, Varnum, Chapter XVI, "The Touch."

If one is to get the most from the course in metalcraft, it will be necessary to read all of the references. Much of the information given in the readings will be invaluable as a general fund of knowledge and also in the tests which are given at the completion of each project.

"Be Prepared"

Test

(Write 10 questions only)

1. Britannia metal was first made in America by the firm of Reed and Barton, who are still located at..... This firm was established in 1842.
2. Some of the medieval technical methods of working pewter are essentially the same today. Three of the methods are.....
3. The method used by the manufacturer to produce quantity for the increasing demand is called.....
4. Britannia metal is made from other metals and, therefore, it is called an.....
5. The three metals used in making britannia or modern pewter are.....
6. Modern pewter, being soft, has a melting point of approximately.....degrees Fahrenheit.
7. Soldering is done with a.....or a.....
8. The wooden form used for making the rings is called a.....
9. Solder, when cut in small pieces, is called snippets. The small pieces are used in order to.....
10. When the flame is played on the metal, we have a soldering method called the.....method. When the flame is not played on the metal, we have another method called the.....method. Each has its place in metalcraft.
11. What is meant by "The Touch"?

Pupil's Name.....Test Score.....

project for the beginner in metal craft. A cylinder of wood is turned on the lathe to be used as a mandrel. A piece of metal is cut approximately to size and wrapped around the mandrel. Next, the seam is soldered and, finished, after which the ends of the metal cylinder are trimmed. By cutting the cylinder into two parts, two napkin rings are produced.

The following instruction sheets show the various steps taken in making the rings. Reference readings are listed, and the related and technical information is acquired right in the shop. For this purpose a reading corner is provided. When the student has finished the project, he is given a written quiz covering the reading assignments. The lesson sheet is shown on page 71.

LEARNING HOW TO MEASURE

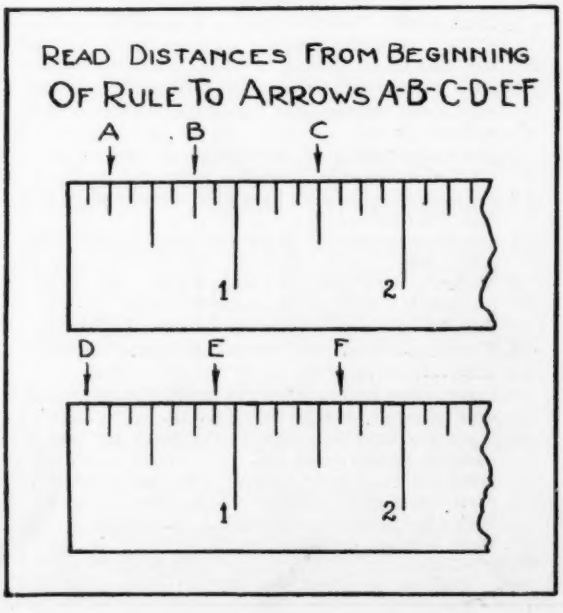
Fred W. Nickel, Cleveland Junior High School, St. Paul, Minnesota

Many boys in the shop do not know how to read the graduations on the rule. The device described herewith for checking or testing, whether the students do or do not possess this accomplishment, has been found very helpful. It may be used as a preliminary check for a new class or it may be used as a test after a lesson on the reading of the rule has been given.

Have an enlarged portion of the rule drawn on the blackboard showing at least 2 in. of graduations. Have the members of the class respond as to where the ½-in., ¼-in., and ⅛-in. graduations appear on the rule. If necessary, the graduations may be put in with different-colored chalk in order that they may be more easily identified.

After a short drill, erase the illustrations on the blackboard and pass out checking sheets similar to the one shown. If desirable, these checking sheets may be made on different-colored stock, and the dimensions A, B, C, D, E, and F, may be changed on the various-colored cards so that the boys will be unable to copy from their neighbors.

Distribute also plain pieces of paper, measuring about 4 by 4 in., to the students. Instruct them to place their name on the sheet together with the date and the number designating their particular class. Tell them to write the letters A, B, C, D, E, and F vertically on their sheet and behind each letter place the dimension shown on their particular checking sheet. The fact that all dimensions should be read from the beginning of the rule must, of course, be emphasized. The time required for this test can be varied to suit the ability of the class.

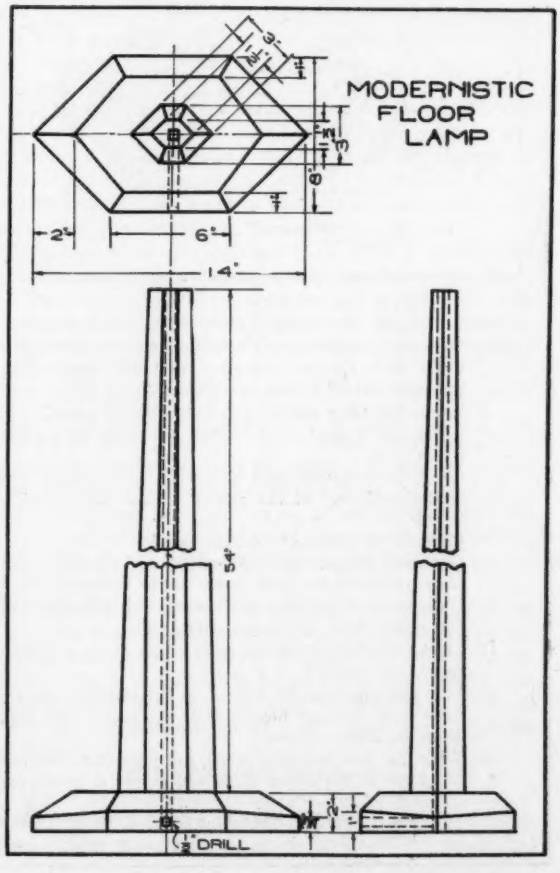


MODERNISTIC FLOOR LAMP

U. L. Hiatt, Director Manual Arts, La Junta, Colorado

The ordinary floor lamp is a wood-turning project, but in our school we have all boys serve a certain length of time at the bench before they are permitted to use the turning lathe. This time period can be materially reduced by the character of work done with the hand tools. The demand for a floor lamp that was different gave me the opportunity to design one that could be made with hand tools or with the aid of the power saw and planer. To make it a little different in name as well as design we called it our *modernistic lamp*. We permit the boy to choose the kind of wood he wishes to use for the project, but suggest to him that it be of a kind that will harmonize with the furniture at home.

The material needed to construct this lamp is a piece of 2 by 6, 7 ft. long. Cut off a piece 55 in. long, and rip it down its center on the power saw. Joint two faces and cut a groove ¼ by 7/16 in. down the middle of each of the jointed faces. Then glue them together. (Of course, the grain of these two pieces should run in the same direction.) Now, take the remaining 29 in. and cut it into two pieces 14½ in. long. Probably the 2 by 6 in. actually measures only 5½ in. when jointed. It will then be necessary to glue on one 3-in. piece ripped from the second piece. This will give a base of 8 by 14 in. when squared up. After the glue on the standard of the lamp is thoroughly dry, square the piece to 3 by 3 in. Then inspect the standards, and choose the end with the greatest amount of grain showing, as the base of the lamp. Saw each end square leaving the standard



54 in. long. Now lay out the taper and saw it out by hand or with a power saw. The next step is to lay out the hexagon on each end, as shown in the illustration. After thorough sanding with 1/0 garnet paper, raise the grain with a sponge moistened in warm water. After drying for 24 hours, sand lightly with 3/0 garnet paper. In working up the base, joint each edge and surface each face, choosing the better face for the top. Draw center lines lengthwise and across the base. Lay out the hexagon as shown. Saw off and plane to the lines laid out. Now refer to the drawing to lay out the irregular chamfer. Plane to these lines and sandpaper, as as was done with the other piece. Before assembling, bore a ½-in. hole in the center of the base for the wire. From one side, bore a 6/16-in. hole into the ½-in. hole. On the length center line, 1 in. each way from the center, bore a 4/16-in. hole and countersink for 2 No. 10 by 3-in. f.h. screws for fastening the base and standard together.

Finish the lamp to match the furniture with which it is to be used.

A shade for this lamp may be made of a wire frame 18 in. in diameter bent to the shape of the base. Cover this with satin ribbon, the strips of ribbon being laid over each other at the top of the shade and just touching at the base.

A DOOR KNOCKER

J. W. Bollinger, Tulsa, Oklahoma

Door knockers were placed on doors in former days so that the visitor might make known his presence to the inmates of the house. They are often used for the same purpose today, although their primary purpose nowadays is to serve as an ornament.

The design described herewith is small enough so that it may be placed on the wood part of a door next to the glass.

1. Cut the two pieces for the backs out of 16-gauge sheet iron. Saw and file out to the shape shown.

2. To make the ball, place a piece of ¾-in. round stock in the lathe, and drill a ¼-in. hole an inch or more into the end. Turn the outside to the design shown in the drawing. File smooth and polish with emery cloth, then cut off the excess stock.

3. Cut the piece for the knocker, and slide the ball in place on it. Upset the ends of the ¼-in. round iron and flatten them out. Drill a 3/16-in. hole in each end.

4. Scribe the shape of the knocker on a piece of tin or galvanized iron.

5. To help bend the knocker, cut a slot 5/16 in. wide, into the end of a short piece of ⅜ by 1½-in. iron, about ¼ in. from the edge. This will serve as a bending fork. Place the ¼-in. round iron into this slot, and bend the rod a small amount. Move it a little farther along, and make another small bend. As you proceed, compare your results with the layout that you have made. Continue this procedure until the desired curve has been obtained. Be sure to keep the ball in the center of the piece; it may be held there by riveting it in place with a ⅛-in. pin.

6. To make the support, shape an eye with a 7/32-in. hole on the end of a piece of ½-in. round iron. Cut about ¼ in. behind this eye down to ¼ in. diameter on the lathe. Cut off the excess stock at this end.

7. Drill a ¼-in. hole into the back, and file this hole slightly oval shaped and countersink it on the back side. After riveting the support to the back, it will be found that the support and consequently also the knocker will not turn about the riveted part as a pivot.

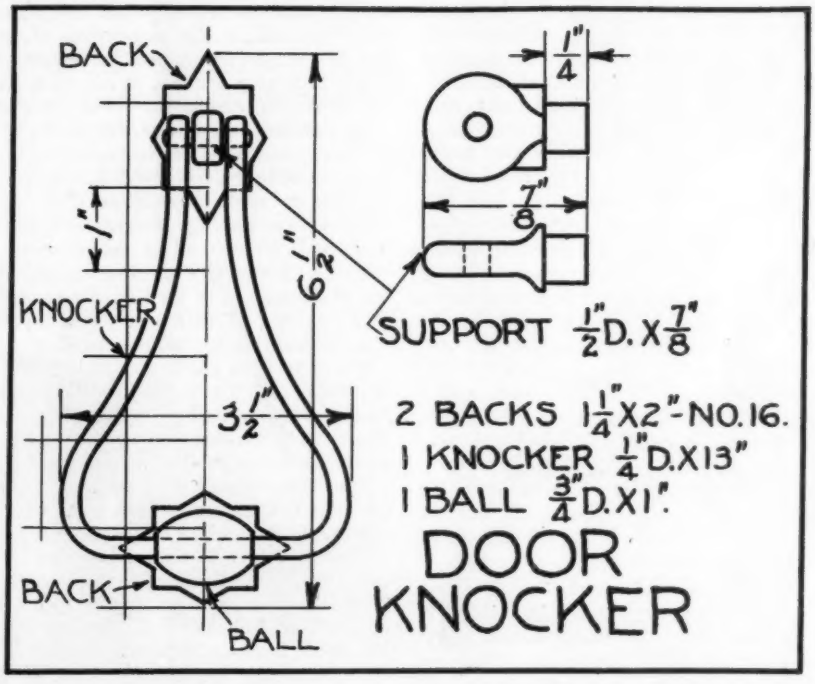
8. Rivet the knocker to the support with a 3/16-in. rivet, so that the knocker swings freely.

9. Drill the holes through the two backs, so that they may be fastened to the door.

10. Give the completed job two coats of flat black paint.

FEDERAL AID LIMITED TO VOCATIONAL TRAINING

Vocational guidance does not fall within the jurisdiction of the Federal Board for Vocational Education and should not be confused with vocational education, according to Mr. Edward T. Franks, vice-chairman of the board, in a statement issued on December 26.



The purpose of vocational guidance, the board's report emphasizes, is to assist boys and girls to determine in what way they can best utilize their opportunities, their abilities, and their ambitions. This assistance can best be given by a system of vocational guidance, which the report states, is now regarded as an important function of the general public school.

Attention was called to the fact that there is some confusion of thinking as regards the relative functions of vocational education and vocational guidance. For this reason,

some general educators, the report states, fail to see why federal funds cannot be used to contribute to the support of courses whose purpose is frankly prevocational or vocational guiding in character. Frequently, such courses have a semblance of vocational training since practical activities similar to those of vocational courses may be carried on in them.

The explanation was made in order that the impression that the Federal Board should promote vocational guidance may be cleared up. The Board was created solely for the promotion of vocational education and is not permitted under the terms of the National Vocational Education Law to expend any of the funds provided for the promotion of vocational guidance.

A Finish That Pitted

The answer to Question 925 which appeared in the September, 1930, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION should have read as follows:

A.: The entire trouble in producing your finish on the walnut is caused by the use of oil in your sanding work. In the first place, oil should never be used on undercoat sandings. In the second place, it is of no avail to try and get it off again with alcohol, for the reason that the wood around each pore is saturated. When a coat of shellac is applied it cannot cling to the wood around the greasy pore and hence withdraws upon itself to form a ring, or pit.

To get started right again, clean off all the job with a good varnish remover, then follow with rags saturated in denatured alcohol, to break up any traces of paraffin remaining from the remover. Sand clean to bright wood. Apply a water stain rather than the one made of asphaltum, which, unless of a particular type, is a mean trouble-maker. Without sanding, apply a coat of orange shellac diluted with 4 quarts of denatured alcohol. The orange shellac should be used rather than the white, since the latter will leave a gray cast beneath the varnish. Sand the dried shellac coat with a split 6/0 paper. Dust off and fill with a silex filler, chocolate brown in color, carrying about 12 lb. of filler per gallon of thinner which should be made of 1 part of pure turpentine and 2 parts of gasoline. Clean off thoroughly and let dry 48 hours. If the time is short, make up a solution of 1 quart of denatured alcohol and 1 quart of standard shellac, mix and stir slowly into ½ gallon of shellac mixing lacquer. This will give a splendid material which can be brushed easily with a soft bristle brush—a Fitch, for instance. Sand clean with a split 6/0 paper. This finish is quite waterproof and wear resistant.

If sufficient time still can be had for a varnish finish, use a high-grade four-hour varnish, sand between coats, and rub the last with FFF pumice stone, crude oil, and felt pad. Clean up with a good polish.—*Ralph G. Waring.*

Repairing Chipbreakers

933. Q.: Frequently beginners in our woodworking shop choke up their jack planes, that is, by improper handling of the plane, shavings are forced in between the chipbreaker and the cutting iron. When this happens the chipbreaker is bent out of its proper shape and will not fit down properly again, causing the plane to choke worse when attempt is made to use it again. The process of grinding the proper shape again on the chipbreaker, or filing it, or whetting it on an oilstone is a very slow and painful process, since that job has to be very accurately done.

Is there a short, efficient method for doing this job?—*H. A. A.*

A.: When the chipbreaker is bent out of shape it is extremely hard to get it back to the proper shape; in fact, the time spent trying to do this job will more than buy two plane-iron caps.

There is, however, a way to prevent this trouble of choking up planes, and that is the proper adjustment of the plane-iron cap to the plane iron. If the plane-iron cap is set away 1/16 in. from the cutting edge, and securely tightened to the plane iron, this choking will stop. I think the reason the planes choke, is that the plane-iron cap is set too close to the cutting edge, and if a heavy cut is taken, as most boys do, at least in the early stages of learning, the plane iron is bound to clog.

For general work done by boys in the manual-training shop which is mostly in soft wood, the plane-iron cap should not be set closer than 1/16 in. to the cutting edge. If, however, curly pieces of hard wood are to be planed, it becomes necessary to set the plane-iron cap to 1/64 in. away from the cutting edge of the plane iron to prevent tearing of the grain.—*Fred W. Ziegenhagen.*

THE A. V. A. CONVENTION

The attendance at the fifth annual convention of the American Vocational Association, held at Milwaukee, Wisconsin, December 10, 11, 12, and 13, exceeded all expectations. The widespread interest and large attendance at this convention demonstrated forcibly the advantages of a centrally located meeting place which is accessible to the greater percentage of those who make up the membership of the Association. The fact that a city was chosen for the convention which thoroughly believes in the type of education for which the American Vocational Association stands, no doubt also had much to do with bringing so large a number of people to the meetings. No matter what the real cause for the increased attendance was, Milwaukee is very happy to have had the privilege of acting as host to the members of the A. V. A.

The general meetings were all well attended and great interest was shown in all of the addresses, from the opening address by Milton C. Potter, superintendent of public instruction at Milwaukee, to the last address at the banquet session Friday evening at which over 700 were present. The sectional meetings were no less well attended.

The decorating instructors again had worked out a very interesting program on which international association men, master painters, tradesmen, representatives of the Federal Board, state directors, and instructors, took part. The programs were enlivened by a number of fine demonstrations.

The industrial-arts sectional meetings were also well patronized. The topics that came up for discussion were "Good Practice in School Use of the General Shop," "Implications in Industrial-Arts Teaching Development," and "Annual Report of A. V. A. Committee on Standards in Industrial-Arts Teaching." With speakers such as R. W. Selvidge, University of Missouri, Columbus; F. E. Tustison and A. G. Brown, The Stout Institute, Menomonie, Wis.; W. E. Warner, Ohio State University, Columbus; George K. Wells, State Supervisor of Industrial Education, Indianapolis; Roy R. Van Duzee, Supervisor of Industrial Arts, West Allis, Wis., and Wm. L. Hunter, Iowa State Colleges, Ames, on the firing line, it is unnecessary to state that the subjects were well handled and that the discussions were instructive and conducive of much good.

In the vocational-education sections, the topics "Examples of Vocational Training in Type Industries," "Examples of

(Continued on Page 24a)

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School Training for Unskilled and Semiskilled Work," "Examples of Vocational Education in a Small Community," "Training for Junior Technical Positions in Industry," "Examples of Training in Industry for Specialized Operations," "Some Results of Apprentice Training," and "The Foreman Industry" were discussed, and again the caliber of the speakers chosen for the subjects give evidence of the value of the discussions. Among those on the programs were Dr. John A. Lapp, Marquette University, Milwaukee; Arthur J. Rowland, Educational Director, Milwaukee Electric Light and Power Company; B. N. Rickard, American Smelting and Refining Company, El Paso, Texas; W. R. Scheel, Director Vocational Education, Tampa, Fla.; Thomas H. Quigley, Georgia School of Technology, Atlanta, Ga.; K. G. Smith, State Supervisor Trade and Industrial Education, Lansing, Mich.; G. L. Greenawalt, Principal, Vocational School, Jackson, Mich.; Edward Berman, Principal, Vocational School, Bayonne, N. J.; H. G. Williams, Director, Whitfield School of Trades, Detroit, Mich.; H. G. Noyes, State Coördinator of Trades and Industries, Appleton, Wis.; E. E. Gunn, Jr., State Supervisor of Industrial Education, Madison, Wis.; James R. Coxen, Federal Board for Vocational Education, Washington, D. C.; F. J. Hubbard, State Director of Vocational Education, Jackson, Miss.; E. C. Comstock, State Supervisor of Industrial Education, Montgomery, Ala.; and N. S. Hunsdon, State Supervisor of Trade and Industrial Education, Austin, Tex.

Newly Elected President of the A. V. A.
C. M. MILLER
State Director Trade and Industries, Topeka, Kansas

The problems of apprenticeship training and part-time education were discussed under the headings of "Training for Junior Technical Positions in Industry," "Examples of Training in Industry for Specialized Operations," "Some Results of Apprentice Training," "The Foreman Industry," "Beginnings in Part-Time Education," "Coördination and Part-Time Education," and "The Present and Future in Continuation Education."

The speakers on these programs embrace men both from industry and from the field of vocational education. Among them were: R. A. Audree, Oakland Motor Car Company, Pontiac, Mich.; L. A. Wilson, Assistant Commissioner of Education, Albany, N. Y.; M. L. Wilson, Bell Telephone Laboratories, New York City; C. A. Fulmer, State Director of Vocational Education, Lincoln, Nebr.; J. F. Biehl, Apprentice Supervisor for the Cincinnati District Board of Education, Columbus, Ohio; C. E. Hedden, Mohawk Carpet Mills, Amsterdam, N. Y.; L. A. Peck, Joliet, Ill.; Cleo Murtland, University of Michigan, Ann Arbor, Mich.; Harold Falk, Vice-president, The Falk Corp., Milwaukee; F. J. Jeffrey, Assistant Superintendent of Vocational Education, St. Louis, Mo.; E. L. Heusch, State Supervisor of Trade and Industrial Education, Columbus, Ohio; George P. Hambrecht, State Director of Vocational Education, Madison, Wis.; Oakley Furney, Chief, Bureau of Industrial Education, Albany, N. Y.; F. S. Rutherford, Acting Director of Technical Education, Toronto, Can.; A. W. Crawford, Department of Labor, Toronto, Can.; C. A. Unewehr, Principal, Washburne Apprentice School, Chicago, Ill.; Dr. Caroline Zachry, State Teachers' College, Montclair, N. J.; A. H. Dyon, Western Electric Company, Chicago, Ill.; Arthur Speer, American Cast Iron Pipe Co., Birmingham, Ala.; G. A. Holmes, Hawthorne Works, Western Electric Co., Chicago, Ill.; George H. Parkes, Director of Vocational Education, Williamsport, Pa.; R. O. Small, State Director of Vocational Education, Boston, Mass.; L. H. Dennis, Deputy Superintendent of Public Instruction, Harrisburg, Pa.; John E. Carpenter, Principal, Sacramento Continuation High School, Sacramento, Calif.; I. S. Noall, State Supervisor of Trade and Industrial Education, Salt Lake City, Utah; J. Ray Stine, Principal, Akron Continuation School, Akron, Ohio; William J. Regan, Principal, Central Continuation School, Buffalo, N. Y.; G. C. Mann, Director of Vocational Education, Berkeley, Calif.; and Dr. R. L. Cooley, Director of Vocational Education, Milwaukee.

Printing education was discussed at a sectional meeting, and the topics of "Modern Typographical Trends," "Humidity Control," "Printing Education," and "History and Progress of Paper Making and Printing" were discussed. Edward D. Berry, Northwestern University, Chicago; Robert T. Williams, Carrier Engineering Corp., New York City; Prof. David Gustafson, Carnegie Institute of Technology, Pittsburgh, Pa.; O. H. Runyan, Bradner-Smith Company, Chicago; and E. E. Sheldon, R. R. Donnelley & Co., Chicago, were the speakers on the program. This section also had a dinner meeting at which they were guests of the Milwaukee Club of Printing House Craftsmen, and they made several interesting plant visitations.

Vocational guidance, vocational rehabilitation, and vocational teacher training each came in for their share of attention at the convention. Under vocational guidance, "National Trends in Guidance Procedure," "The Linking of Industry and Guidance," "The Organization and Operation of a Program of Guidance, Placement and Coördination in a Part-Time School," "The Administration of Guidance in a Full-Time School System," "Employment, Unemployment and Guidance," and "The Attitude of Organized Labor Toward Guidance," were discussed.

Dr. R. L. Cooley; Emma Pritchard Cooley, Director of Vocational Guidance, New Orleans, La.; Wiley A. Miller, Manager Industrial Relations, Bucyrus-Erie Company; G. D. Whitney, University of Pittsburgh, Pittsburgh, Pa.; Anne S. Davis, Director of Vocational Guidance Bureau, Chicago; William F. Patterson, Director of Guidance and Employment, Milwaukee Vocational School; F. C. Rosecrance, Director of Life Advisement, Milwaukee; F. J. Keller, Principal, East Side Continuation School, New York City; A. H. Edgerton, University of Wisconsin, Madison; William Leiserson, Antioch College, Yellow Springs, Ohio; Henry Ohl, Jr., president, Wisconsin Federation of Labor, Milwaukee; and Mrs. Jennie M. Turner, State Board of Vocational Education, Madison, Wis., were some of the speakers.

Under vocational rehabilitation the topics "Vocational Education in Rehabilitation," "Guidance in Rehabilitation," and "Obstacles to Placement of Cripples in Industry" were discussed. Among the speakers on these programs were H. L. Stanton, Supervisor of Vocational Rehabilitation, Raleigh, N. C.; Charles R. Allen, Federal Board for Vocational Education, Washington, D. C.; L. H. Lasher, Assistant Supervisor of Rehabilitation, Milwaukee; Jacob Klaassen, Assistant Supervisor of Rehabilitation, Lansing, Mich.; Lewis H. Carris, National Society for Prevention of Blindness, New York City; George P. Hambrecht, State Director of Vocational Education, Madison; W. F. Faulkes, State Supervisor of Rehabilitation, Madison; Mrs. W. R. Fringer, Supervisor of Rehabilitation Education, Rockford, Ill.; Mrs. E. W. Porter, Assistant Supervisor of Rehabilitation, Milwaukee, Wis.; Alexander C. Crockett, Board of Education, Detroit, Mich.; Terry Foster, Federal Board for Vocational Education, Washington, D. C.; Oscar M. Sullivan, Director of Reëducation, St. Paul, Minn.; J. H. Hendrickson, Assistant State Supervisor of Rehabilitation, Indianapolis, Ind.; Tracy Copp, Federal Board for Vocational Education; Dr. Stewart Scrimshaw, Marquette University, Milwaukee; Fred M. Wilcox, Industrial Commission, Madison, Wis.; Dr. D. D. Lescohier, University of Wisconsin; and Dr. John Lapp, Marquette University, Milwaukee.

Vocational teacher training was discussed under the topics "Training Vocational Teachers in Established Teacher Train-

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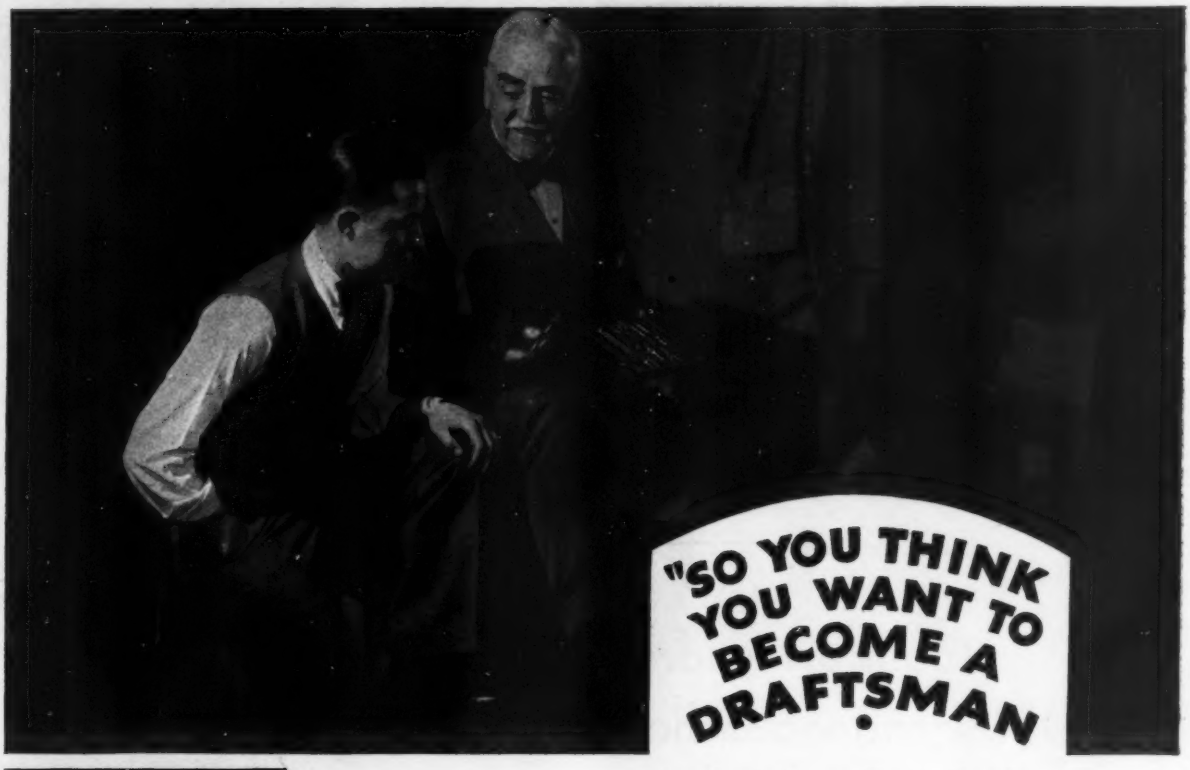

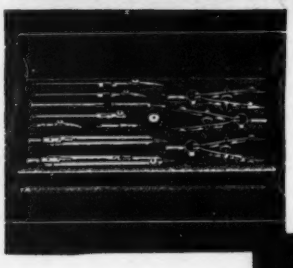

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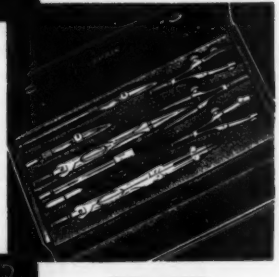

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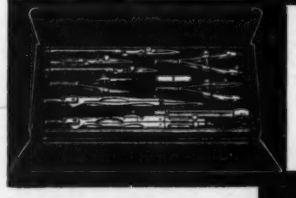

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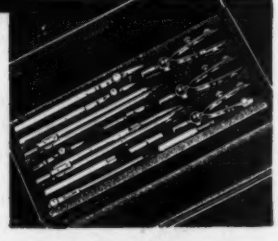

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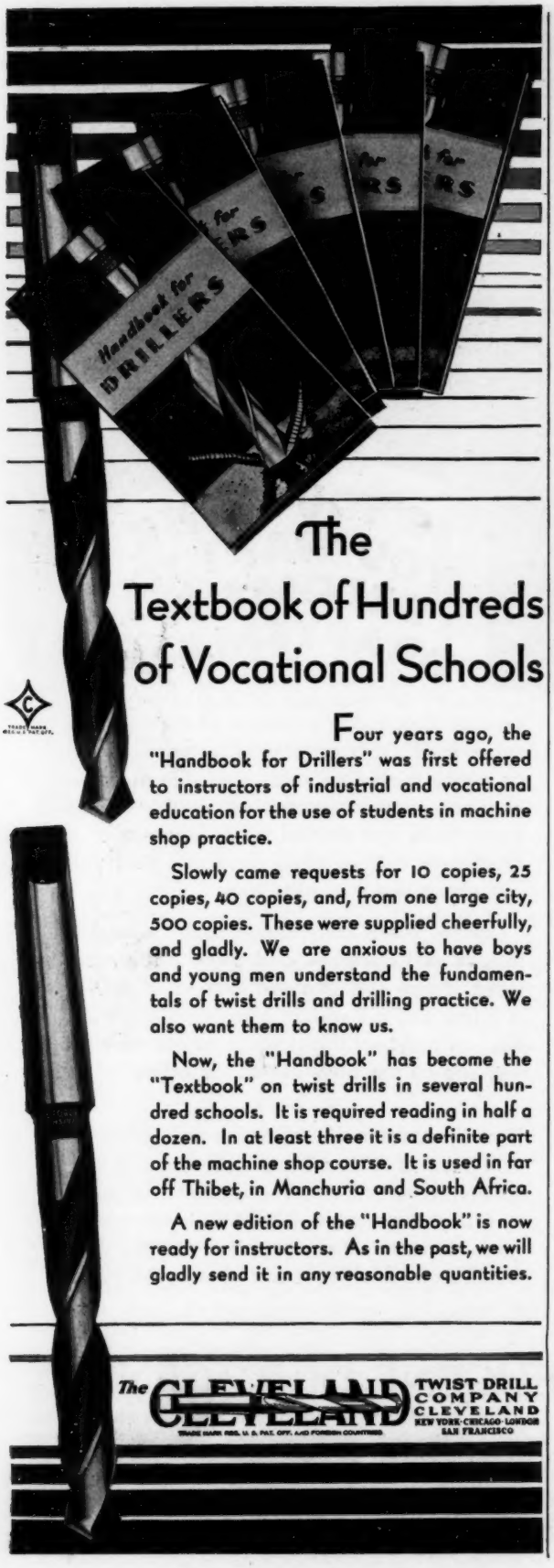
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(Continued from Page 24a)

ing Institutions" and "Training Vocational Teachers in Service." Speakers on this program were George E. Myers, Ann Arbor, Mich.; R. W. Selvidge, Columbia, Mo.; Henry W. Klonower, Harrisburg, Pa.; Harry Tieman, Department of Public Instruction, Fort Collins, Colo.; G. A. McGarvey, Washington, D. C.; H. W. Paine, Toledo, Ohio; J. G. Spofford, Trenton, N. J.; E. E. Gunn, Jr., Assistant State Director of Vocational Education, Madison; Wm. F. Rasche, Principal, Milwaukee Vocational School; Eugene Fink, Director of Trades and Industries, Albany, N. Y.; and G. D. Whitney, University of Pittsburgh.

At the business session of the House of Delegates, which was addressed by Paul W. Chapman, president of the American Vocational Association, the following officers were elected to guide the destinies of the association for the coming year:

President, C. M. Miller, State Director Vocational Education, Topeka, Kans.; secretary, Z. M. Smith, State Director Vocational Education, Indianapolis, Ind.; treasurer, Chas. W. Sylvester, Director Vocational Education, Baltimore, Maryland.

Executive Committee: Ray Fife, State Supervisor Agricultural Education, Columbus, Ohio; Margaret M. Edwards, Head, Home-Economics Department, Alabama College, Montevallo, Ala.; Irvin S. Noall, State Supervisor Trade and Industrial Education, Salt Lake City, Utah; Regina E. Groves, Supervisor Commercial Department and Teacher Trainer for State Board of Vocational Education, Madison, Wis.; Paul W. Chapman, State Director Vocational Education, Athens, Ga.; H. L. Stanton, State Supervisor Vocational Rehabilitation Education, Raleigh, N. C.; and Wesley A. O'Leary, Deputy State Commissioner of Education, Trenton, N. J.

The attendance at the convention totaled more than 3,000. About 65 life memberships were reported. The next convention will be held at New York City.

DECEMBER MEETING OF BOSTON VOCATIONAL EDUCATIONAL SOCIETY

The Vocational Society of Boston held its December meeting on Saturday, December 13, at the Hotel Westminster, Boston, Mass. The principal speaker was Mr. George Just, secretary-manager of the Boston Typothetae, who took for his subject, "Is There a Job for Every Trained Apprentice?" Mr. Just pointed out that in many communities this is a debatable question, but he firmly believes that if vocational educational were carried on as successfully as it is in the Milwaukee Vocational School, this ideal could be attained.

In his talk, Mr. Just suggested that more care be used in the selection of the boys who are to be given vocational training. Many times, he said, boys are attracted to trades in which they have not the necessary ability to succeed. In the printing field, for instance, the opportunity for a boy to use his own printing press and work at home fascinates him, and causes him to seek vocational training in this field.

Mr. Just pointed out that he came from a plant which had a very definite apprentice-training program by which they rotated the boy through the different departments to determine which branch the boy fits into most effectively. After the particular industrial line was determined, the boy was sent to school at the expense of the company. At the close of the talk, Mr. Just answered questions put to him by interested members. Mr. Coates followed with a description of the five-year follow-up system for the State of Massachusetts.

Forty-five members attended. — *Louis A. Van Ham.*

VOCATIONAL SOCIETY OF WASHINGTON COUNTY HOLDS MEETING AT WASHINGTON, PA.

The Vocational Society of Washington county held its meeting in connection with the regular county institute. At the various sessions of the society, a number of interesting talks were given. Mr. John J. Metz, editor of the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine, took the topic, "The

(Continued on Page 28a)

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Vocational TRAINING

Every Regal lathe must meet the LeBlond test — the same guarantee of workmanship and accuracy.

It is built in 10″, 12″, 14″, 16″ and 18″ swing, with center distances for every requirement.

Note these features: 8-speed selective geared headstock, long bearing carriage, deep wide bed, feed rod—to take the wear off the lead screw. No shifting of belts to change speeds. All moving parts enclosed. Motor is mounted on the leg with enclosed multiple V-belt drive. Lathe is shipped fully equipped (including motor), ready to run.

$398.00
F.O.B. FACTORY

The Regal is a precision lathe designed primarily for vocational training purposes. The student who graduates from a Regal equipped school shop has nothing to unlearn. His experience will dovetail with the demands he must meet in the most modernly equipped plants of the nation.

Both the instructor and student will appreciate the advantages of the Regal lathe. It aids in the most exact teaching of the student, and he leaves the school a credit to the institution that trained him.

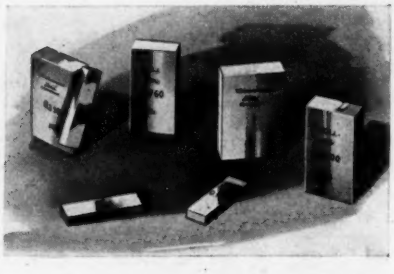
The simplicity and safety of operation of the Regal, the sturdiness of construction, the ease of control, the precision and accuracy, freedom from breakage, and the 8-speed selective geared head, typical of modern machine tool practice, make it the ideal lathe for the vocational school. Made in a range of sizes to meet your requirements, and sold at a price that means buying economy. Write for complete details.

The R. K. LeBlond Machine Tool Co.
CINCINNATI, OHIO

Johansson

Gage Blocks and Accessories

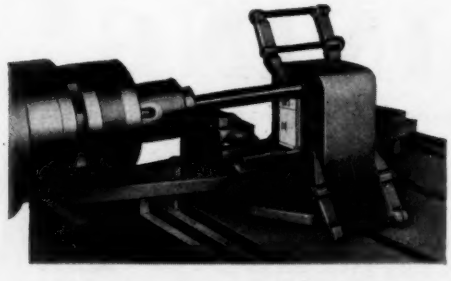
reflect the "Security of Accuracy" throughout the entire factory, when used as a standard for measurements of length



PRODUCTION COSTS must be reduced to meet present-day competition. The use of Johansson Gages makes it possible.

Visualize the many advantages of having a complete gaging system that can be carried to any department of the shop and there give the required size gage.

Johansson Gage Blocks and Accessories have been given the name "world's standard of measurement." With them, two or more mechanics can measure the same dimension of length and get the same results within one ten-thousandth part of an inch. Available in three accuracies. Delivery from stock. Send maximum and minimum dimensions, with closest working limits; we will recommend a gaging system to meet your requirements.



Johansson Gage Blocks used to check locations in relation to each other on a boring machine

Prices and literature on application—order direct or through your mill supply dealer

C. E. JOHANSSON, *Inc., Division of*

FORD MOTOR COMPANY

Detroit, Michigan

(Continued from Page 26a)

Industrial-Arts Teacher and His Job," speaking on the necessity of better preparation for the teacher and attendance at summer school for professional advancement. Mr. Metz pointed out that the teacher should be broad-minded, should keep informed on modern science, and should frequently do some real work himself to show his ability as a craftsman. Production work, if properly handled, may be made profitable for the class, and in this connection the shop teacher should do his utmost to coöperate with the other members of the faculty. In order that such work does not deteriorate into exploitation, the teacher must maintain accurate and complete records on the progress of his students.

Speaking on "Some Industrial-Arts Teachers I Have Known," Mr. Metz told of the types of teachers with whom he had come in contact, emphasizing that the virtues of some are worthy of emulation while the errors of others should be avoided.

Dr. G. B. Whitney, of the University of Pittsburgh, spoke on "Evaluation of the Job Sheet," citing some of the advantages and disadvantages. He pointed out that some teachers use the job sheet as a crutch, while others use it as a help in giving instruction. Job sheets in book form, he said, are not popular as yet, and many teachers still prefer to make their own sheets.

Mr. J. S. Champion, of the state education department, talked on the "Future Farmers of America" and the exhibit to be held in Harrisburg. Mr. Arthur D. Wilson, of the Findlay Vocational School, discussed the "Contract System of Teaching Vocational Agriculture."

The meeting closed with the election of the following officers: President, G. H. Bullock, Claysville, Pa.; vice-president, J. H. Ryburn, Washington, Pa.; secretary-treasurer, Mrs. E. E. Schroyer, Washington, Pa. Mary Bell Rankin, of Trinity High School, was elected a delegate to the state convention at Williamsport. — *George C. Donson.*

MECHANIC-ARTS TEACHERS HOLD ELECTION

At a meeting held on December 11, the following were elected officers of the Mechanic-Arts Teachers Association of Philadelphia: President, Elmer H. Briggs, Gratz High School; vice-president, William B. Toll, Penn Treaty Junior High School; secretary, Herbert W. Metcalfe, South Philadelphia High School for Boys; and treasurer, Edward M. Fee, Northeast High School.

RHODE ISLAND VOCATIONAL SOCIETY MEETS

At the last meeting of The Rhode Island Society for Vocational Education, the following were elected officers for the next year: President, Walter Ritzau, Technical High School; vice-president, Edward Frail, Providence Trade School; and secretary-treasurer, Chester A. Ruoff, Providence Trade School.

PITTSBURGH INDUSTRIAL-ARTS ASSOCIATION HOLDS MEETING

The Industrial-Arts Association of Pittsburgh and vicinity held a meeting on December 3, at the Y.M.C.A.

The principal speaker was Dr. Ben G. Graham, superintendent of schools of Pittsburgh, who talked on the need of a broad scheme of education for the present day. Dr. Graham pointed out that, along with hand training, there should be appreciation, since specific training is not sufficient for citizenship and for living in this day of mass production.

Another speaker was Mr. H. G. Masters of the personnel department, who addressed the organization, speaking of the future work he expects to do.

A motion was made and approved that the society revise the constitution and by-laws.

Among those in attendance at the meeting were Mr. T. A. McGarvy of the Federal Board for Vocational Education, Washington, D.C., and Mr. W. E. Brunton, state supervisor of Harrisburg. — *George C. Donson.*

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REGISTERED

PORCELAIN SPLIT KNOB HAS

"A GRIP LIKE IT'S NAME-SAKE"

Assembled on Screws or Coated Nails

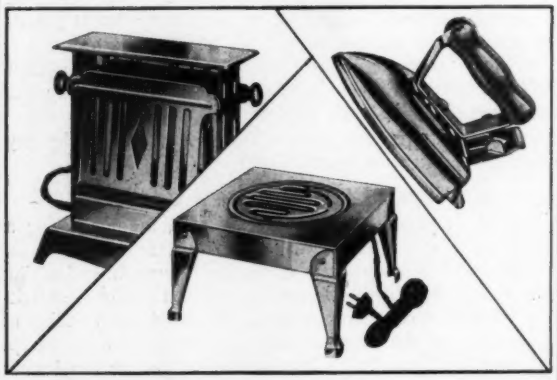
The Only Wiring Method That Gives Adequate Insulation

Standard Knobs Tubes Cleats Special Porcelain

Illinois Electric Porcelain Co.
Macomb, Ill.

ELECTRIC PROJECTS

Irons --- Toasters --- Stoves



Here are three excellent projects for your school shop. All very practical and useful articles, full household size, and built of the best materials. High nickel finish. Each project comes complete, ready for assembly; nothing extra to buy.

Prices: Stove - - lots of 10 - - 85c each
Flatiron - - lots of 10 - - 95c each
Toaster - - lots of 10 - - 85c each

Instructor's sample kit containing all three projects, $3.00. Remittance with order.

Write for special prices on quantity orders.

CHICAGO ELECTRIC MFG. COMPANY
2801-35 So. Halsted St. Chicago, Ill.

C-H "Rubber Mounted" Enclosed Toggle Switch is quiet—nothing to transmit noise. Simple mechanism—not a screw in it and only one rivet. Case of C-H Thermoplax.

Giving Students the "*Jump*" in Experience

FAMILIARITY with Cutler-Hammer Products and the engineering principles which they embody is a short route to valuable practical experience for your students.

Cutler-Hammer Wiring Devices and Safety Switches are famous for trend-setting design and good workmanship ... for adaptability, ease of installation ... and safety ... all resulting from over three decades of intimate contact with Industry's electrical problems. They are known, accepted ... often demanded ... by those who must be satisfied by your students in their life work—and consequently C-H Products deserve an important place in the classroom and in the shop.

C-H Products may be obtained through leading electrical wholesalers. A copy of each of the C-H booklets *"Modern Wiring Necessities"* and *"Safety Switches"* will be sent free to instructors.

CUTLER-HAMMER, Inc.
Pioneer Manufacturers of Electrical Apparatus
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CUTLER HAMMER
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Wiring Devices ··· Safety Switches
(A-404)

Kewaunee Drawing and Art Tables Save Space— Accommodate More Students

Drawing Table No. L-2035

Art Table No. L-2077—This well designed art table provides 6 drawers with locks, for instruments and tools of 6 students, also compartments for six drawing boards. The top is adjustable and sufficiently large to take care of either junior or senior high school or university work.

Drawing Table No. L-2044 provides individual instrument drawer and drawing compartment for 4 students. Drawer and compartment can be locked with one padlock. Stationary top is 47 inches long and 31½ inches wide.

Art Table No. L-2077

Drawing Table No. L-2035

This compact, substantial drawing table will accommodate six sections and provides six private drawers for tools and instruments and space for six drawing boards. The drawers are furnished with or without locks. This Drawing Table is built of finest oak and is rigidly constructed. Where large classes in limited space are necessary, this Art Table will be found ideal.

It will be a pleasure to show you our exhibit at the N. E. A. Convention, Detroit, Mich., Feb. 21-26, 1931.

Drawing Table No. L-2044

Write for Kewaunee Book

The Kewaunee Book pictures the full Kewaunee Line of Art and Drawing Room Furniture, as well as Laboratory and Library Furniture. It pictures installations that show how these tables save floor space and accommodate the largest possible number of students comfortably. Write for the Kewaunee Book on your institution's letterhead and it will be sent without charge.

Kewaunee Mfg. Co.
LABORATORY FURNITURE EXPERTS

C. G. Campbell, Pres. and Gen. Mgr.
245 LINCOLN ST. KEWAUNEE, WIS.
Designers and Manufacturers of Art and Mechanical Drawing Room Furniture for Schools and Colleges
Factories at Kewaunee, Wis., and Adrian, Mich.

School Shop Equipment News

For the Supervisor and Teacher who desires to keep abreast with news of new Machinery, Tools, Supplies, etc.

DE WALT ALL-STEEL FABRICATED BAND SAW

The De Walt Products Corporation, of Lancaster, Pa., has announced a new line of all-steel fabricated band saws.

The machines are complete, with metal frame and stand. They are light in weight, sturdy in construction, prevent vibration, and thus increase the life of the saw blade. The machines are electrically welded, making them compact, sturdy, and rigid.

The band saws are manufactured in two types, the two-wheel unit and the three-wheel unit. All models are furnished with 16½-in. diameter aluminum wheels, mechanically balanced, mounted on Timken bearings, and provided with a simple and easily adjusted tracking device for lining the band-saw blade. The machines have greater throat clearance, all running parts are completely inclosed, and efficient guards are provided for minimizing hazards to the operator.

A feature of the machines is the protection afforded against the breaking of saw blades. One operator reported only one blade broken during a six months' period.

Complete information and prices may be obtained by any school-shop instructor upon request.

THE ROUSE INTER-LOCKING PAGE FRAMES

The H. B. Rouse Co., of Chicago, Ill., are marketing a device which will interest every printshop teacher.

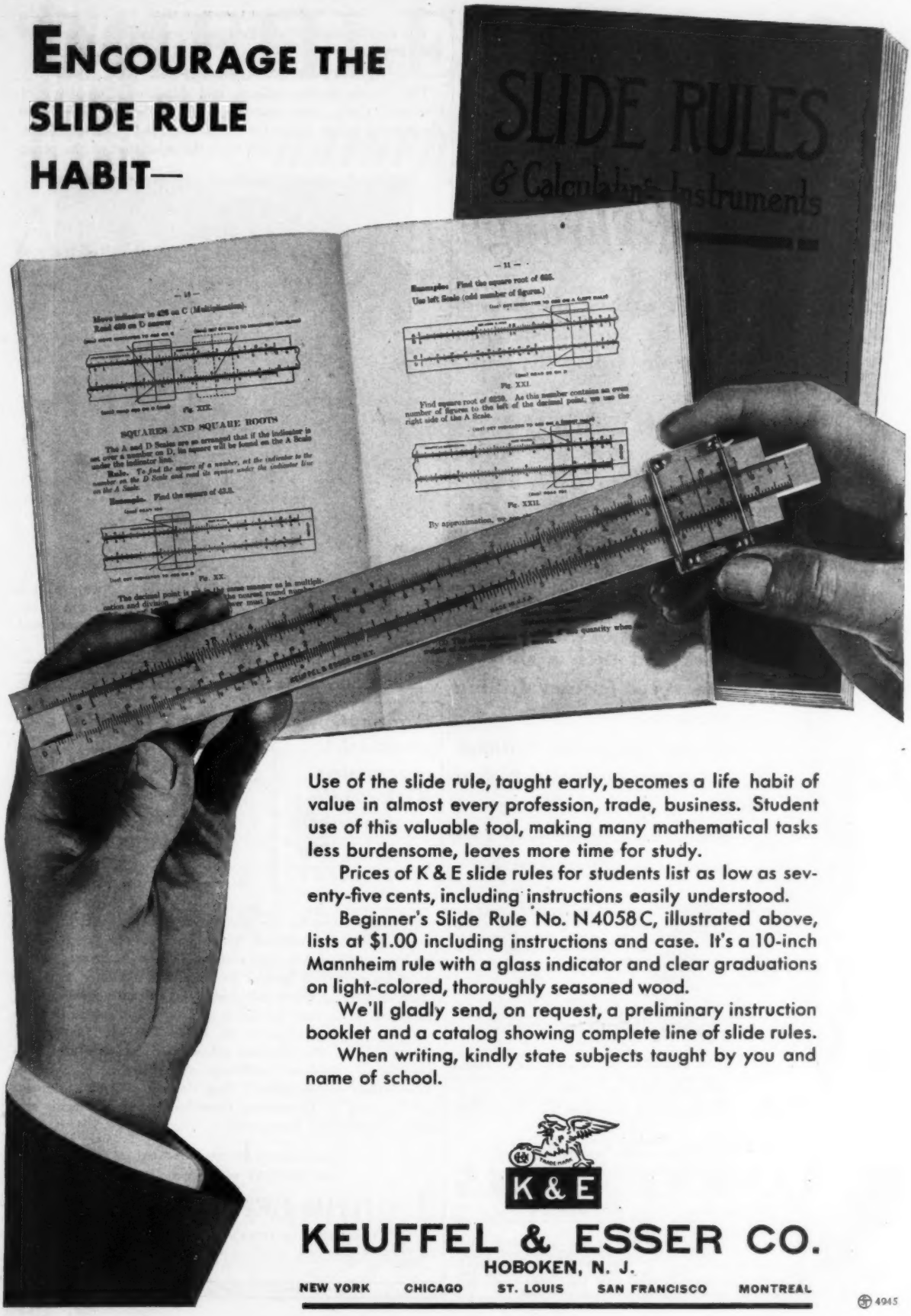
This device is known by the name of Rouse Inter-Locking Page Frame. It is really a thin steel chase 12 points in thickness. It locks firmly around each type page and remains in place while on the press or while in storage. To prevent pi and work-ups, the Rouse Page Frame system is the logical successor to the old-fashioned string tie-up method.

NEW SAVOGRAN BOOKLET ON FURNITURE REFINISHING

The Savogran Company, of Boston, Mass., has issued a 23-page booklet, entitled, *How to Repair and Refinish Furniture*. The booklet, which was prepared by Mr. G. B. Perry, offers practical information on the refinishing of furniture. It tells how to remove the old finish, describes the processes of refinishing, enameling, and undercoating, and outlines the methods used in producing hardwood finishes, dull-rubbed finishes, lacquering, and antique effects. It offers suggestions for the care of brushes, cleaning floors and woodwork, and numerous other purposes.

(Continued on Page 34a)

ENCOURAGE THE SLIDE RULE HABIT—



Use of the slide rule, taught early, becomes a life habit of value in almost every profession, trade, business. Student use of this valuable tool, making many mathematical tasks less burdensome, leaves more time for study.

Prices of K & E slide rules for students list as low as seventy-five cents, including instructions easily understood.

Beginner's Slide Rule No. N4058C, illustrated above, lists at $1.00 including instructions and case. It's a 10-inch Mannheim rule with a glass indicator and clear graduations on light-colored, thoroughly seasoned wood.

We'll gladly send, on request, a preliminary instruction booklet and a catalog showing complete line of slide rules.

When writing, kindly state subjects taught by you and name of school.

K&E

KEUFFEL & ESSER CO.

HOBOKEN, N. J.

NEW YORK CHICAGO ST. LOUIS SAN FRANCISCO MONTREAL

4945

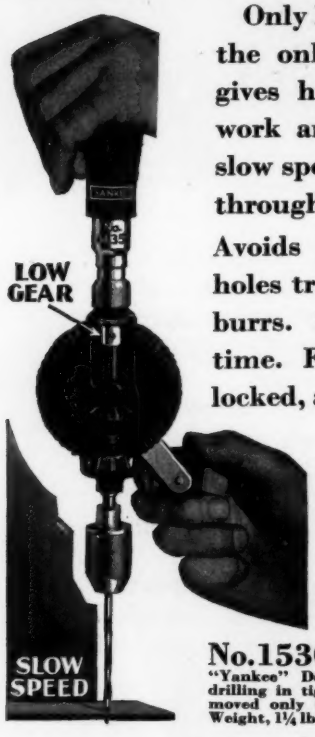
Easy Drilling Through

MANY a time the hole is burred . . . or drill snapped —and no fault of the workman.

"Yankee" No. 1435, a new *two-speed* hand drill, takes care of ticklish jobs with small drills in thin metal—or thick.

Only 11 inches long! And the only small drill that gives high speed for fast work and then a shift to slow speed for easy drilling through.

Avoids jamming. Makes holes true, smooth, free of burrs. Saves drills. Saves time. Fast or slow, or tool locked, at a finger touch.



No. 1435. —"Yankee" Two-Speed Drill. Length, 11 in. Weight, 19 oz. Three-jaw chuck; ¼ in. Price, $4.50.

No. 1530. —"Yankee" Ratchet Drill. Five adjustments, including "Yankee" Double Ratchet for continuous drilling in tight places where crank can be moved only to and fro. Length, 10½ in. Weight, 1¼ lbs. Three-jaw; ¼ in. Price, $5.25.

Ask dealer for "Yankee" Hand Drills.
Use COUPON to get free "Yankee" Tool Book.

"YANKEE" TOOLS

MAKE BETTER MECHANICS

NORTH BROS. MFG. CO., Philadelphia, U. S. A.

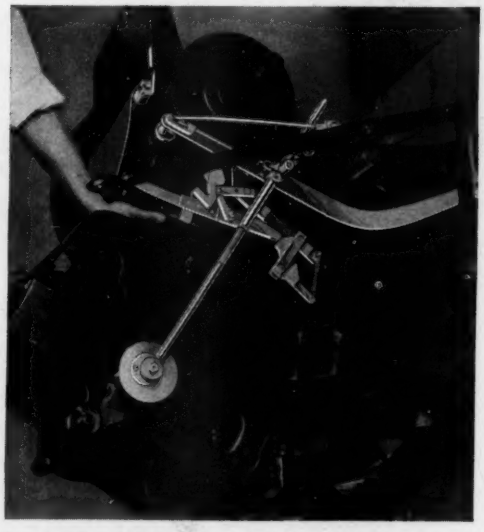
You may send "Yankee" Tool Book (offered in Industrial Arts) —Showing Spiral and Ratchet Screw-drivers, Automatic Push Drills, Ratchet Braces, Socket Bit-Extensions, Ratchet and Plain Breast and Hand Drills, Automatic Chain and Bench Drills, Ratchet Tap Wrenches, Continuous-Work Swivel Vises, Plain Screw-drivers, Etc. *(Please clip and write name and address in margin below)*

(Continued from Page 32a)

The booklet may be obtained by any school-shop instructor upon request.

NEW PLATEN-PRESS SAFETY GUARD

The National Sherardizing and Machine Company, of Hartford, Conn., has announced the marketing of its new platen-press safety guard for use on hand-fed printing presses. The guard does not interfere with the operation of the press,



nor does it affect the speed of the press. The device, which is intended to prevent accidents, is fully automatic, and is being installed in schools for the protection of inexperienced operators.

Compact, practical, progressive. With 105 illustrative charts. Octavo, 390 pages, $2.75

ADULT EDUCATION

THE EVENING INDUSTRIAL SCHOOL

Presenting the case for the evening industrial school, this book gives in detail the methods which have proved successful in operating such schools. The authors, Charles A. Prosser, director of Dunwoody Industrial Institute, and M. Reed Bass, assistant director of Dunwoody Industrial Institute, Minneapolis, Minnesota, write with the first-hand knowledge, gained in fourteen years of experience in the field. The book deals with such topics as: The Evening School as a Business, The Evening School Student, Buildings and Physical Conditions, "Functioning Subject-Matter," Unit Courses of Study, Selection and Training of Instructors, Organization, Management, and Administration and Instruction.

THIS IS ONE OF THE VOLUMES IN THE CENTURY VOCATIONAL SERIES

THE CENTURY CO.

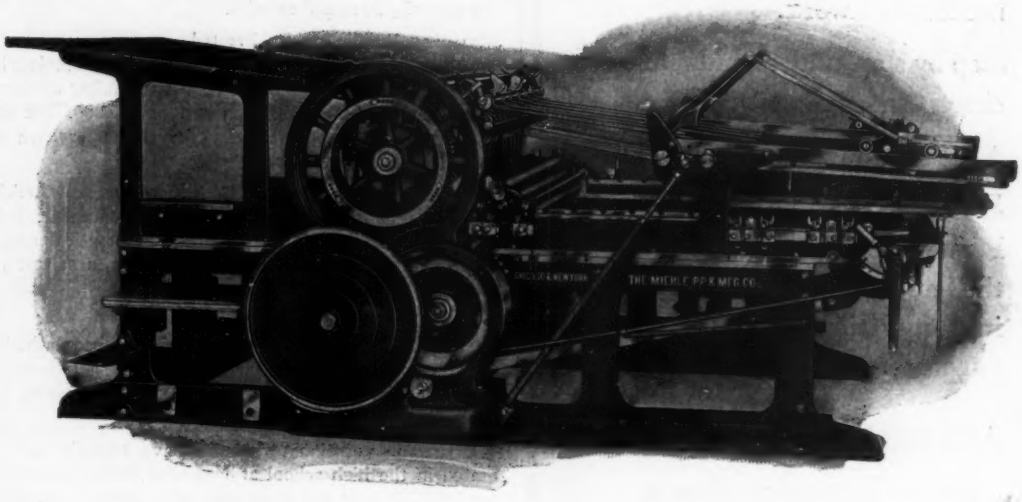
PUBLISHERS OF THE NEW CENTURY DICTIONARY

353 Fourth Avenue NEW YORK — 2126 Prairie Avenue CHICAGO

"MIEHLE"

naturally suggests

Advanced Printing Instruction



A COMPLETE course in printing is impossible without one or more cylinder presses, and the school shop which does not include these in the equipment fails to bridge the gap between elementary experiment and true commercial practice—fails to fulfill its obligation to provide a well rounded, balanced course in printing.

¶ The Modern School Shop which boasts a "Miehle" is unlimited in the range of its printing instruction. For the "Miehle," like an "open sesame," immediately lays before students and instructor all the possibilities and all the opportunities of the finest development of twentieth century printing equipment.

We will be pleased to send descriptive literature regarding Miehle presses adapted to school shop instruction.

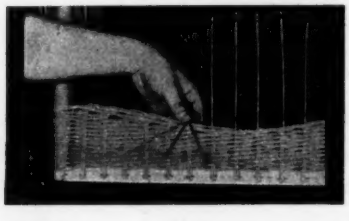
The Miehle Printing Press and Mfg. Company

Fourteenth Street and S. Damen Avenue, Chicago

An Educational Plan For Your School

1. A complete teachers' course of instruction.
2. A suggested course for teachers' use in class work.
3. Step by step, understandable work charts for students' use.
4. A series of folders which will help you to succeed in this work.
5. Personal cooperation, giving you the benefit of actual factory weaving operations for educational purposes.

ALL WITHOUT COST TO YOU



Art Fibre Weaving

is a most practical, interesting, economical and provable training.

One Teacher Says—

I earnestly believe that there is no work more fascinating to all ages of pupils than Art-Fibre Weaving. The number of useful pieces of furniture for the home is unlimited. There is never any lagging in the Art-Fibre teaching game.

What this teacher writes is typical of the many letters we receive indorsing our plan.

Write for Literature *Educational Dept.*

GRAND RAPIDS FIBRE CORD COMPANY

GRAND RAPIDS, MICH.

NEWS AND NOTES

Continuation-School Heads Asks Pay Change

The Continuation School Principals' Association of New York City has asked the school authorities to eliminate size of school as a factor in fixing their salaries. The principals asked that their salary schedule be established on the same basis as that of the elementary-school principals, who are eligible for the maximum salary regardless of the size of the school. It was pointed out that teachers in these schools are paid on a high-school schedule, while the principals are paid elementary-school principals' salaries.

New Shop Building to Be Erected

The school board of Rome, N. Y., has completed plans and specifications for a proposed shop building at the senior high school, to be erected at a cost of $15,000. The building is being planned and erected under the supervision of Mr. Harold G. Rice, architect.

Manual-Training Department Constructs Practical Articles

The manual-training department ot Montpelier, Ind., has devoted its attention to the making of practical and useful articles. The boys have made a number of farm gates, which they sold to local farmers at cost.

Oxyacetylene Welding Course

The school board of Albany, N. Y., has been asked to approve a course in oxyacetylene welding as a part of the industrial curriculum. The course will cover two nights a week.

Vocational Talks at Newkirk, Oklahoma

Classes in vocational guidance have recently been inaugurated in the high school at Newkirk, Okla. Separate classes are held for boys and girls, with talks given by local business and professional men and women.

Welding Course Proposed

Supt. F. T. Vasey has asked the school board to approve the establishment of a night course in welding. The course would cover a period of 38 weeks and would cost about $200 for each person enrolled.

Decorah Manual-Training Department Enlarged

The voters of Decorah, Iowa, recently carried a school-bond issue for extending the high-school facilities. The improvements include additional classrooms, the enlarging of the manual-training department, and a new gymnasium.

Vocational-Guidance Aid in Detroit, Michigan

A group mechanical-aptitude test for boys has been devised by the psychological clinic at Detroit, Mich., to assist in vocational guidance in certain grades. A similar test for girls' mechanical aptitudes has also been developed. Other tests include an individual test of manual ability for use in doubtful cases, and special tests for determining constructive imagination, intelligence, scholarship, and pupils' interest, also have been devised.

Opens High-School Addition

The board of education of Cleveland Heights, Ohio, has opened a new high-school addition, which offers enlarged facilities for additional technical courses. With the new facilities, it is possible to offer courses in forging, sheet-metal work, automobile repair, machine-shop practice, and printing.

Trade School Teaches Electrical Arithmetic

The vocational school at Orlando, Fla., has established a trade class in electrical arithmetic. The course covers the entire subject of electrical mathematics, from the fundamental processes to elementary trigonometry.